

The Mining Journal

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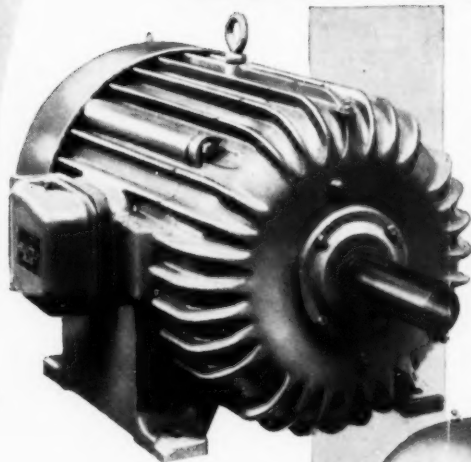
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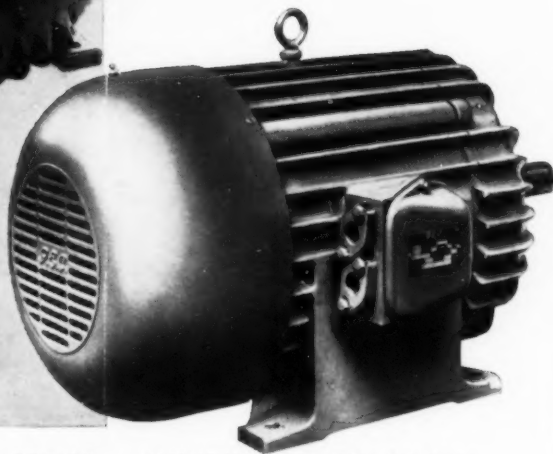
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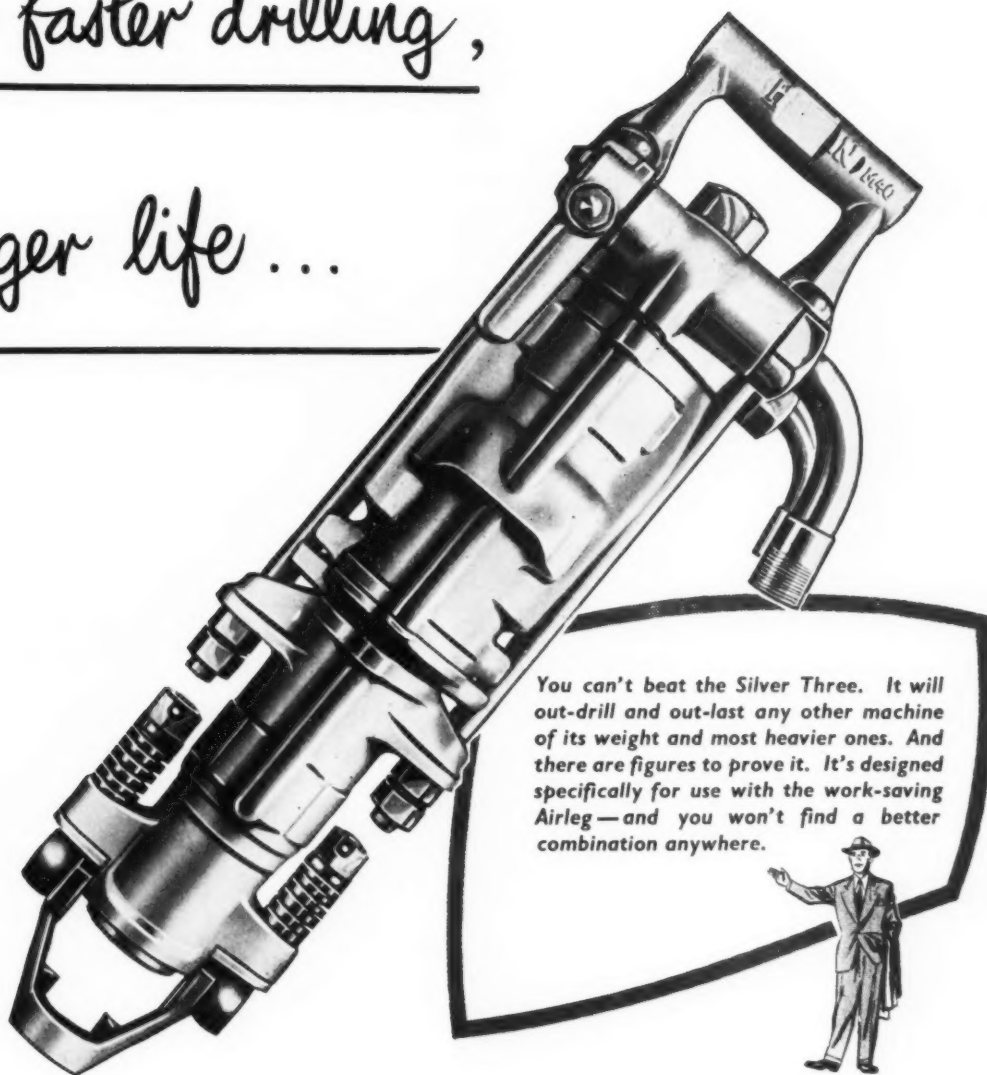
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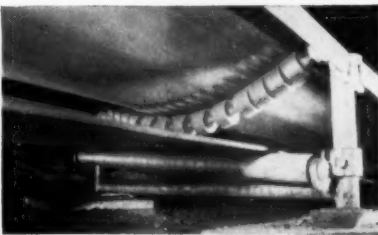
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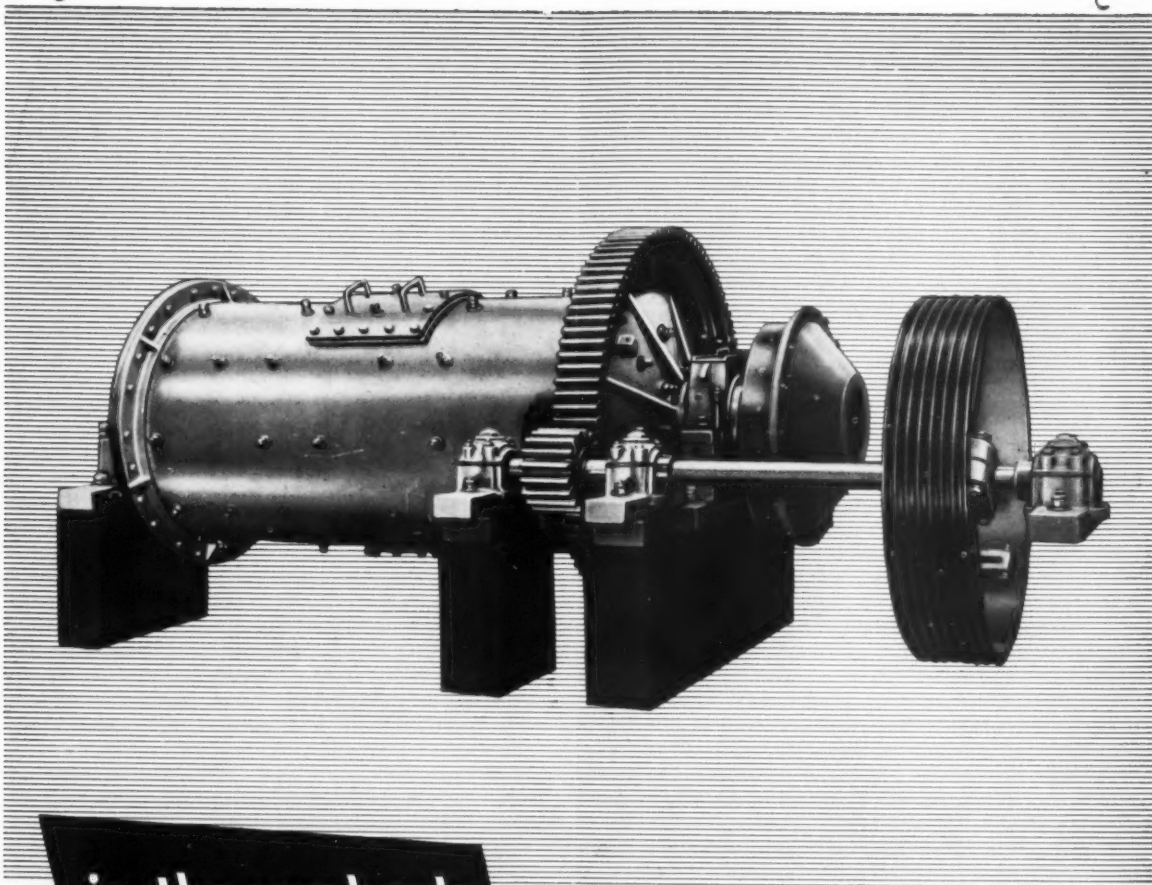
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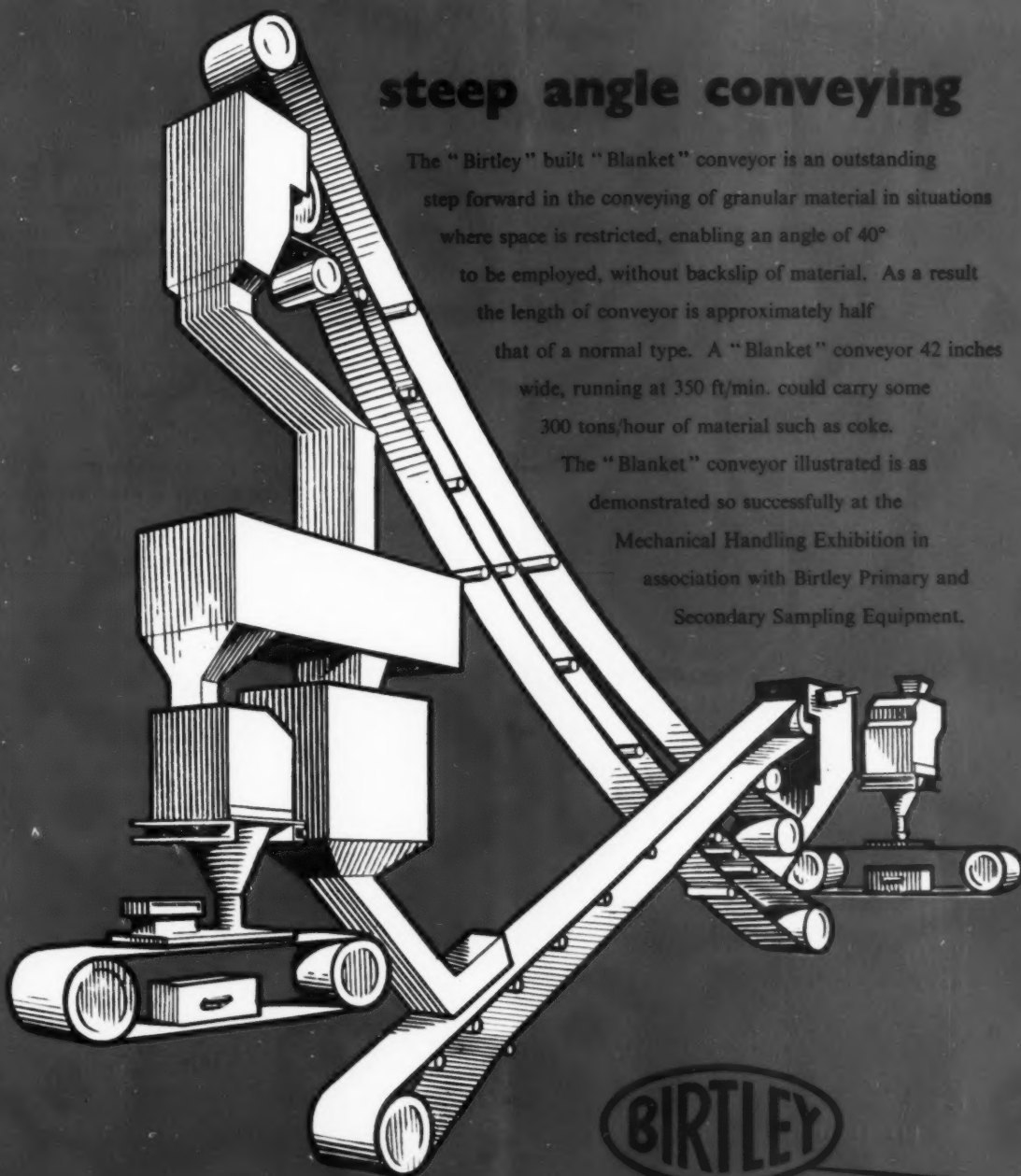
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Although the annual production of aluminium in the free world has increased during the last thirty years from 210,000 tons to over 3 million tons, this is still insufficient to keep pace with the growing demand. Further large increases have become essential as established and new uses require more and more of the metal.

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As a major producer of primary aluminium the Aluminium Limited group has responded to this increasing demand with a programme of continuous development in various parts of the world. In Canada, the new expansion programme in Quebec will increase the ingot producing capacity there to over 700,000 tons per annum. At Kitimat in British Columbia, annual productive capacity is being raised to 330,000 tons by the end of 1959. In Jamaica, production of alumina (aluminium oxide) is being increased to 543,000 yearly. In India, an aluminium smelter with an annual capacity of 20,000 tons is being established at Hirakud, Orissa.

Aluminium Union Limited distributes aluminium ingot produced by Aluminum Company of Canada, Ltd., in addition to exporting the products of the various fabricating companies within the Aluminium Limited group.

At Kemano, the cavern in the mountain houses the vast generators supplying Kitimat with power. The panoramic view below shows a section of the Kitimat smelter.



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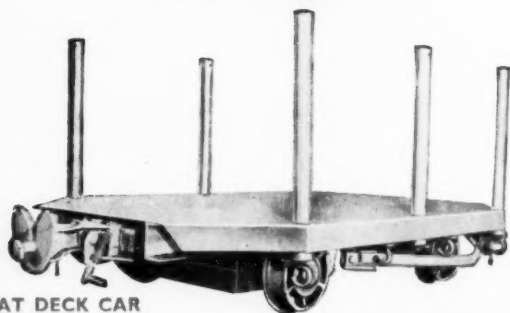
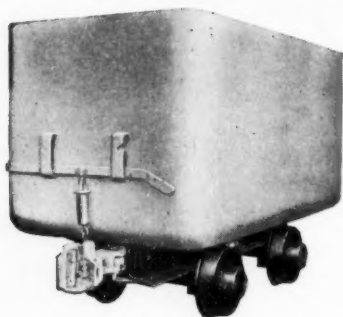
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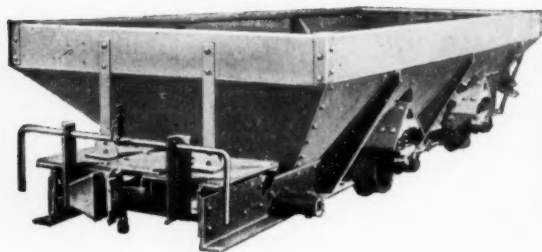


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The Mining Journal

Established 1835

Vol. CCXLVI No. 6303

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NOTES AND COMMENTS

Calder Hall Through Russian Eyes

Britain's progress in the development of atomic power was the subject of a recent article in *Pravda* by Academician I. V. Kurchatov, who accompanied Marshal Bulganin and Mr. Khrushchev on their recent visit to the United Kingdom.

Kurchatov describes the reactor at Calder Hall as "rather cumbersome, being 12 m. in dia. and 20 m. high". He was greatly impressed, however, with the quality of the work in the installation of the equipment and considers that the unit will assuredly be very reliable in operation. The British engineers, he states, are so certain of the reliability of the uranium rods that they do not consider any possibility of the protective castings failing and radioactive products penetrating into the carbon dioxide gas; accordingly, the pipelines of the gas circuit are not provided with any protection against radioactive radiation.

As the Russians see it, Britain is so far pursuing only one trend: gas-cooled and graphite-moderated reactors. Their criticism is that from the economical standpoint this may not prove to be the best solution. True, it permits the use of only natural uranium and the preservation of enriched uranium for other purposes, but it does not permit deep utilization of the natural uranium. It is pointed out that British physicists aim to solve this problem later on with fast neutron breeder reactors. An experimental reactor of this type, states Kurchatov, is to go into operation in Scotland in 1958.

The Russians believe that the implementation of their five-year programme of experimental construction of atomic power plants will ensure wider possibilities for selecting the best ways of developing atomic power. They aim to develop the production of atomic power which, at least in the conditions prevailing in the European part of the U.S.S.R., will be more economical than coal power. On the assumption that only big atomic electric power plants will be economical, plans have been made to build five plants of between 400,000 and 600,000 kW. each. These will be equipped with slow neutron reactors. Several pilot atomic installations, each with an electric power output of

50,000 kW., will also be built and will be put into operation in 1959 and 1960. One will have a homogeneous breeder reactor moderated by heavy water, in which the fuel will be in the form of a fine powder suspended in heavy water. Another unit will have a graphite-moderated and sodium-cooled reactor. It is also planned to build a fast neutron sodium-cooled reactor.

In considering Kurchatov's assessment of the British programme, it should, of course, be borne in mind that a vast fund of new knowledge has been acquired since construction was started at Calder Hall. It can also be taken for granted that not all Britain's discoveries and intentions have been revealed to the Russians, just as the U.S.S.R. most assuredly has many secrets which have not been revealed to the West. Nevertheless the mere fact that a friendly interchange of views and knowledge has taken place can scarcely fail to be mutually helpful and is a notable example of the benefits which are already resulting from the gradual lifting of the Iron Curtain. From the mining industry's point of view it is evident that increasing quantities of uranium and other materials will be required for atomic development in the U.S.S.R., though the extent to which these requirements can be supplied from sources within the Soviet bloc is one of the secrets which have not been revealed.

Fuel Oil versus Coal in Australia

The Joint Coal Board has warned that considerable amounts of New South Wales coal will be displaced by fuel oil next year writes our Australian correspondent.

The recession in black coal production has been gaining ground at increasing pace, accelerated by the erection of oil refineries in three States and the increasing availability of fuel oil for power, and of by-products for use in manufacture of gas. This development is inevitable but the progressive loss of local and export markets over several decades is directly attributable to the organized disruption of the coal mining industry in the attempt by the coal mining unions to control that industry, and in turn, the industrial life of the country.

The abandonment of this policy and the recognition of resulting disaster was marked by the sudden withdrawal of all opposition to the mechanical mining of pillar coal a year ago. But the damage has been done. Valuable export markets that could have been held have been irretrievably lost, and the same disruption of supplies has turned local users more and more to the alternative fuel, oil; industrial troubles have been the stimulus for building up the Victorian brown coal-electric project, with its final development, the manufacture of gas from brown coal, and the loss of the gas coal market to the New South Wales mines. While black coal mining in New South Wales and Queensland must remain an important branch of industry, it is now facing a very real threat. The Joint Coal Board now regards the future as a question of technical efficiency; sections of the industry are inefficient and modern mining methods, together with mechanization, give them the opportunity which cannot be ignored. At the same time it must be recognized that a large part of the industry is carried on with high efficiency, led by Broken Hill Proprietary Co., Australian Iron and Steel, and a number of other colliery companies whose mechanization and modernization of methods is of a high order.

That this advance has not been universal is due to the state of continuous industrial unrest, strong union opposition to mechanization, and the totally inadequate margin between costs and selling price which gave no justification for the capital expenditure called for. The initiative in overcoming this position lies with the big steel companies, the Joint Coal Board, and the early support of progressive collieries. In 1945, New South Wales produced 76 per cent of the fuel of that State, Victoria and South Australia, but at the present time supplies only 66 per cent. In the same period, petroleum products have increased from 7½ per cent to 17 per cent. The community is growing, but coal mining is standing still. The overall market for coal in 1956 should be about 15,000,000 tons but competition by other fuels must be met by production of types and qualities of coal acceptable to consumers.

In this regard, erection of heavy media coal washeries is advancing. As a measure of the coal mining drift, three open cuts and 16 underground mines closed down during 1954-55, and production was 327,000 tons less than in the previous period. The position depends directly upon reduction of cost of coal at the mine, in which mechanization is the most important factor, but which cannot reach and be maintained at its designed level unless labour operates the mechanical units at maximum capacity, and the imposition of the drag on output is abandoned. This limitation on output has had a very serious influence on the cost of coal and and, consequently, on the level of Australian industrial costs generally.

Mechanical mining of pillar coal is proceeding smoothly, and it is expected that reduction in production costs will gradually become apparent, and because of the very large reserves of pillar coal—some 240,000,000 tons—the reduction in costs may assist the industry to meet the growing competition from other fuels. And it must be noted, too, that this huge reserve of high-grade black coal would have been utterly lost to the nation through the attitude of the unions.

Growing Markets for Zirconium and Titanium

Recent reductions in the U.S. price of titanium and the expansion of zirconium production projected by the A.E.C. are expected to stimulate the development of commercial markets for these two important materials. So far the progress of both metals pricewise bears a close resemblance to that of aluminium a century ago.

When aluminium was first produced commercially it cost

£54 a pound. Deville and other early workers were able to bring down the price progressively to less prohibitive levels. Nevertheless, until the discovery of the electrolytic reduction process, aluminium remained too costly for general use and continued to be handled as a precious metal. The effect of the new process was spectacular. In 1886 world production was less than 40 tons per annum, but ten years later some 2,000 tons were being produced annually and the price had fallen to about 1s. 7½d. per lb. Last year the free world produced 2,549,000 l. tons of primary aluminium and output is still being expanded as rapidly as possible to meet the apparently insatiable demand for this useful and versatile metal.

Since the war the search for materials capable of meeting the novel requirements of high-speed flight and atomic energy programmes has focused attention on a number of metals, among them being titanium and, more recently, zirconium, both of which were formerly regarded as scientific curiosities having little or no commercial significance. Both titanium and zirconium have combinations of properties which should lead to major fields of applications, provided the technological difficulties associated with production and processing can be overcome. As in the case of aluminium, in its early days, the factors retarding commercial development are the limited quantities which can be made available and the high production costs.

Substantial headway has already been made in the development of both titanium and zirconium as engineering metals. In 1955, for the first time, the free world production of titanium metal exceeded 10,000 tons. In the U.S. the price of titanium sponge was recently reduced by 20 c. a pound to \$3.25—the fourth cut in 14 months—and in Britain titanium is being sold at 21s. (less than \$3 a pound.) Each price reduction has generated an increasing volume of non-military applications. Within a few years, it is predicted, defence orders will be supplemented by large and diverse applications throughout a number of major industries.

Though zirconium has been known since the late 18th century, it is only in recent years that production of the pure metal in commercial quantities has begun. In the U.S., where the metal is produced in a small way from zircon sand, the selling price has come down in stages from \$300 a pound to \$12 a pound. The A.E.C.'s new programme provides for about 6,000 tons annually at a cost of about \$6 a pound—the price charged for titanium several years ago. Significant quantities will now become available to private industry.

Besides having nuclear properties which are outstanding, zirconium also has many of titanium's desirable characteristics, such as high resistance to heat and corrosion. While not quite so light as titanium, it is a stronger material. Although zirconium is likely to find its main outlet in atomic energy programmes, its superior resistance to alkalis and most acids might well lead to rapid growth in the use of this material as linings for tanks, as pipes and valves in the chemical industry, and as surgical instruments. As volume increases, the cost should be correspondingly reduced.

So far as raw materials are concerned, the world's known resources of titanium and zirconium in mineral ores are sufficient to meet all foreseeable requirements for many years to come.

While titanium and zirconium are likely to become progressively cheaper as production is expanded, aluminium is now trending in the opposite direction. The price of primary aluminium of 99.5 per cent purity, delivered to consumers in the U.K., has risen in stages from £156 per l. ton on January 1, 1955, to the present level of £189. Mr. I. W. Wilson, president of Alcoa, has indicated that the price of aluminium may well have to be raised again. A higher

average return is essential, he stated, if Alcoa and the industry as a whole are to be in a position to develop and adequately serve expanding aluminium markets. Alcoa's own expansion programme will require \$600,000,000. For the past decade, in a period of high business activity, the company's return has averaged slightly less than 8 per cent. With the steadily rising cost of facilities, it becomes more difficult to finance the growth needed to keep pace with demand.

Assuming that the inflationary trend continues indefinitely, it is logical to anticipate that, price-wise, titanium and zirconium will continue to follow the example of aluminium. Technological advances and expanding consumption will result in further falls in prices until a floor is reached. Both metals will then be caught in the inflationary tide and prices will be borne gently but inexorably upwards.

In an expanding economy aluminium has no reason to fear the emergence of titanium and zirconium as engineering materials. The three metals will be complementary rather than competitive. It is interesting to note that the development of atomic power is providing opportunities for aluminium, as well as for the two younger metals. Alcoa's vice-president, Herman E. Bakken, referred recently to a material consisting of an aluminium sandwich containing boron carbide in the centre, which is used in the shielding of reactors. Another new outlet for the light metal is presented by the possible development of aluminium containers for use in the sterilization of food by gamma rays produced from the atomic process or its by-products.

Ceylon and India

(From Our Own Correspondent)

Colombo, May 14.

The output of coal in India increased to 38,220,000 tons in 1955 from 36,880,000 tons in 1954, according to provisional estimates released by the Inspector of Mines, India.

In the interest of conservation and the need to supply coal of fairly uniform quality to the steel industry, washing of metallurgical coal has become necessary. It has, therefore, been decided by the Government of India that generally all coking coal will be washed. An order for a coal washing plant having a capacity of 2,220,000 tons per year (550 tons per hour) has been placed by the Director General of Supplies and Disposals, with Eastern Equipment and Sales Ltd.

This will be the biggest coal washing plant in Asia. It will be supplied from Japan by Dalichi Bussan Kaisha Ltd. The plant will be located at Kargali Bokaro colliery in Bihar to meet the requirements of the Rourkela steel plant and to some extent the requirements of the Russian steel plant at Bhilai.

Despatches of coal from India increased from 32,030,000 tons in 1954 to 32,910,000 tons in 1955. Coal stocks at pit heads at the end of the year amounted to 3,610,000 tons.

The output per man-shift worked by miners and loaders increased from 1,090,000 tons in 1954 to 1,100,000 tons in 1955. An appreciable improvement has been recorded in the use of mechanical equipment. During the year about 8,500,000 tons of coal were cut by coal-cutting machines, 1,300,000 tons conveyed mechanically and 120,000 tons loaded mechanically. The corresponding figures for 1954 were 8,200,000 tons, 1,200,000 tons and 93,000 tons.

Meanwhile, the Government of India has received from the Soviet Union an offer of technical assistance for the development of the Indian coal industry. Mr. Reddy, Production Minister, Government of India, said that the Government was considering whether such assistance was required and if so to what extent and on what terms. He added that there had been offers of such technical assistance or enquiries from other countries such as West Ger-

many, East Germany, France and the United Kingdom. All these offers were being kept in view for consideration at the "appropriate time".

ACCELERATION OF MINERALS DEVELOPMENT

A clear hint that the mineral development policy of India in the second Five-Year Plan would be changed to one of ruthless exploitation of the resources for ensuring the progress of the country on a faster pace, was given by Mr. K. D. Malaviya.

The Minister emphasized the urgent need for substantial augmentation of India's mineral output during the second Plan period. He said there was no doubt that India had achieved much in the exploitation of her mineral resources. But they should not be at all satisfied with that. They should step up their mineral production from the present Rs.1,200,000,000 of value to Rs.5,000,000,000 at the end of the second Five-Year Plan.

Encouraged by the Ministry of Production, Government of India, an agreement has been finalized between a leading Indian manufacturer and two foreign engineering firms of West Germany and Japan for manufacturing, for the first time, a very wide range of mining equipment in India.

Already the initial installation of machinery is in progress at the site of the factory, Nischetti, Bihar, with the help of the West German firm Widig and the Japanese firm of Azen Sakudo, who will be associated with the venture.

In view of the heavy programme of mechanization that will have to be undertaken to meet the ambitious coal target under the second Five-Year Plan, the Government of India is particularly interested in having mining equipment manufactured in the country.

It is considered not unlikely that India will require to import equipment, both conventional and specialized, worth Rs.600,000,000 for the mechanization of coal fields under the public sector alone.

MINING IN ORISSA

The Government of India and the Orissa Government have equal shareholdings in the Orissa Mining Corporation, which has been established to obtain ores and sell them to foreign countries. The Corporation will have as its immediate target 1,000,000 tons of ores annually. In due course other mines will be taken over.

Portugal

(From Our Own Correspondent)

Foz Do Douro, May 4.

Discussions are still continuing regarding the most suitable site for the erection of the plant destined to make Portugal virtually independent of foreign iron and steel, the annual import value of which is about £9,000,000. Nor has any decision been taken as yet concerning the site for the plant which will also make Portugal virtually independent of supplies of foreign tin-plate. But we are on certain ground in reporting that 500 tons of ilmenite was recently shipped to London via Southampton.

March export figures show a heavy fall in the tungsten bearing ores, no cassiterite having been shipped. However, shipments of roasted and leached pyrites were resumed. The March figures, given below, also show a heavy decline in the export of tin metal.

The export figures for March are (in tonnes):—tungsten bearing ores, 189; cassiterite, nil; cupreous pyrites, 45,601; haematite, 13,764; magnetite, 5,399; roasted and leached pyrites, 12,250; roasted pyrites, 142; manganese, 485; tin metal, 7,263 kilos; white arsenic, 122.

URANIUM IN FRANCE—I.

The Uranium Industry in France

By MAURICE MOYAL

In our issue of June 1, 1956, it was pointed out that the layman is very much at the mercy of atomic scientists and governments for the scope and extent of his appreciation of uranium's potentialities. Until comparatively recently the veils of secrecy enshrouding the extraction and production of this metal had never been parted. The following article presents a proportion of hitherto classified information with regard to the uranium deposits of France, the location of the ore treatment plants, and the various chemical and physical processes used in production. In the first portion of the article, which appears herewith, the location of uranium-bearing areas is described, while in the subsequent instalment treatment processes will be discussed. Photographs are reproduced by courtesy of the Atomic Energy Authority of France.

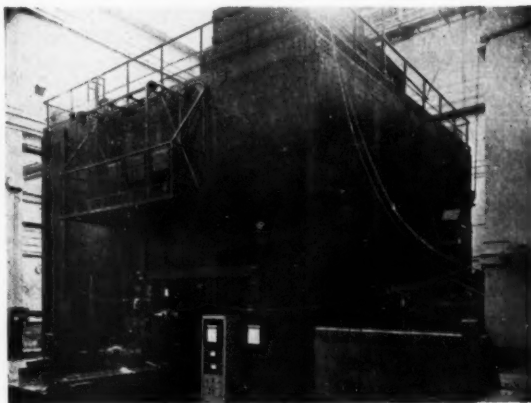
Already boasting rich deposits of iron ores and coal, France has proved to be one of the biggest depositaries of uranium ore wealth in the world. The French-controlled Madagascar island also contains tremendous reserves of high-grade uranium and thorium ores.

The country's Atomic Energy Authority is now bent on methodically prospecting all potentially uranium-bearing Hercynian granitic terrains, which cover over half of France's total area. The regions, already proved uranium-bearing by major strikes, are divided into four provinces.

PROVED URANIUM-BEARING DISTRICTS

In Lachaux Province, in the Puy-de-Dôme district, some 50 years ago, a schoolteacher unearthed the existence of pitchblende at Lachaux, in the Massif Central, the mountainous heartland of Middle France. In 1947, a preliminary reconnaissance confirmed the importance of his discovery. After eight years of intensive exploitation, the Lachaux deposits are now nearly exhausted, but the uranium they yielded permitted the country to start her first experimental atomic piles.

Almost mid-way between Roannes and Vichy, at 12.5 miles south of Lachaux, the richest pitchblende deposits on the Continent were discovered at St. Priest-la-Prugne. The Limouza Well, started in 1953, revealed a massive accumulation of the oxide at shallow depths, extending in almost vertical veins well over 600 ft. in depth. The average content of the local ore is 1 kg. of uranium per metric ton. It is partly treated at the Lachaux plant, and partly stocked, to be enriched at the plant now under construction. Only the highest-grade ores are shipped directly to the Bouchet plant, in the Greater Paris area. The local resources are expected to cater for a sizeable part of the



The second French experimental pile at Saclay in the Greater Paris area

country's uranium consumption for many more years.

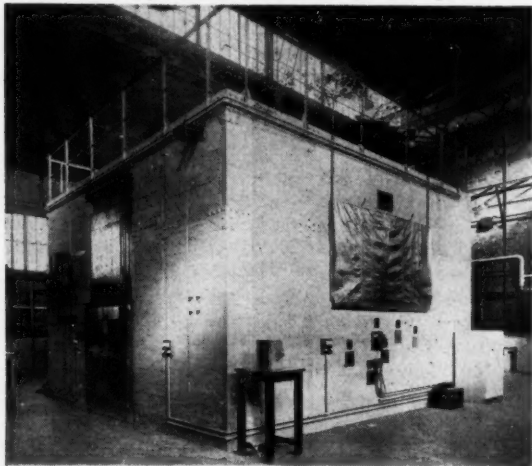
Most promising readings have also been logged at Ambert, also in the Forez mountains, 62.5 miles south of Lachaux. After extensive drilling and sampling, underground workings have already been started in the area.

In La Crouzille Province, in the Upper-Vienne district, the La Crouzille deposits have also been estimated to contain tremendous reserves. These deposits also occur as pitchblendes. The Henriette Well established a gross pay-thickness of 800 ft., possibly extending well over 200 ft deeper.

The A.E.A. has methodically prospected the whole of the northern section here, unearthing scores of deposits extending all the way between Ambezac and Bessines. The more important deposits are those situated at Sagnes and Brugeaud. Although taken individually these deposits are not very rich, yet their high number and concentration in a relatively small area have permitted the large-scale extraction of ores.

The third area of importance is Grury Province, in the Saône-et-Loire district. After registering at first negative results at St. Symphorien-de-Marmagne, the A.E.A. has brought under exploitation sizeable deposits, but with low metal content, at a site near Issy-l'Évêque. Other promising orebodies at Broses, near Grury, at La Faye, and in the immediate vicinity of the town of Chateau-Chinon, will be methodically worked in the near future. The resources of the area have led to the construction of a chemical plant at Gueugnon which started operating in 1955.

The latest province to be created, in 1953, Vendée Province, may well prove the richest in France. As early as 1950, two deposits were unearthed in this district, respectively near Clisson, and near Mortagne-sur-Sèvres. Both bear favourable comparison to the richest deposits in the world, either in regard to high metal content at Clisson, or



"Zoe", the first French experimental pile at Châtillon, Greater Paris

to the tremendous size of the proved reserves at Mortagne, which are the biggest in France. But as these have a low metal content, a chemical plant has been provided at L'Escarpeire to treat them. Near Herbières, another promising strike has been registered.

The A.E.A. may well decide to create a fifth metropolitan French uranium-province in Brittany. At Lignol (Morbihan district), an individual prospector has struck it rich along the banks of the Scorff river. The A.E.A. has granted him a five years' concession over his find, and is purchasing his ore to the tune of some 20 tons a day. Favourable results have also been logged in southern Brittany.

Three other individual prospectors have registered claims with the A.E.A. in other areas. Elsewhere in France, the Beaujollais, Allier, Creuse and Lozère districts, and also the Alps and Pyrénées mountains are favourably regarded for their uranium-prospects. Large deposits are known to exist in the Vosges mountains, in eastern France, but in schist form which renders their exploitation difficult.

In Madagascar Province, the large African island in the Indian ocean, pegmatites were the object of the first studies. But the deposits were too poor and in too complex a form to warrant commercial exploitation. Thus, efforts were shifted to lacustral sedimentary deposits at Vianinkarena, in the Antsirabé area. An enriching plant has been built here, to save costly transportation charges.

Towards the end of 1953, a whole series of urano-thorianite deposits (mixed oxide of uranium and thorium) were discovered, chiefly by the Société des Minerais de la Grande Ile, in the region of Fort-Dauphin, in south-eastern Madagascar. This is one of the major strikes in the world.

The presence of thorium in impressive quantities has been proven here, while the high metal content of the local ores perhaps exceeds that of the richest deposits in France. Thus, in a small eluvial area alone, 70 tons of urano-thorianite concentrates are known to exist. A 5-mile canal has been dug to bring water to the washery under construction, and studies as to the best extraction and concentration methods are proceeding on the spot.

In April, 1954, the Société des Minerais de la Grande Ile

delivered to the A.E.A. a first shipment of urano-thorianite concentrates, totalling five tons. The quantities shipped are shrouded in secrecy, but it is certain that the operator more than fulfilled the quota of 15 tons of concentrates it undertook to deliver in the course of the first year of operation.

An intensive prospecting campaign is afoot all over other potentially uranium-bearing French overseas territories, namely the Hoggar, Adrar of Iforass, and Air ranges in the Sahara, in the Cameroons, the Ubangui and Gabon territories in French Equatorial Africa, and in Algeria and Morocco. It has transpired that some phosphate deposits in Senegal and more particularly Morocco, contain a certain amount of uranium.

Uranium has been discovered at Azzegour and Bou Azzer, in Morocco's South Atlas mountains. That at Bou Azzer is in complex form that would make its exploitation difficult, but that at Azzegour is in pitchblende form. No exploitation of Moroccan uranium is possible for the time being, but research is proceeding with the help of the A.E.A.

PRODUCTION METHODS

Although the A.E.A. operates on an appropriation 20 times smaller than its British opposite number, and a personnel of 4,000, of whom only 1,000 are engaged directly in geological and mining activities—as against 20,000 in the U.K.—it has nevertheless achieved a big success in its hunt for uranium.

This success must be ascribed to efficient prospecting methods. Each promising area gets honeycombed with Geiger counters, so as to locate the smallest radioactive anomaly. When such a feature is encountered, geologists establish a detailed radioactivity map, divided into 5-metre, and in some cases even 1-metre squares. This allows for the location of promising structures, which are investigated by systematic drilling and underground working.

In most cases, a likely location is pin-pointed by shallow drill holes. Subsequently a 120-ft. shaft is sunk to explore the area underlying the surface alteration terrain. Big ore-samples are shipped to the A.E.A.'s laboratories to determine suitable extraction and treatment methods.

Iron Ore Mine Under the Baltic

Preliminary work on an undersea iron ore mine began this spring on the Baltic Island of Nyhamn. The mine, which will make a welcome contribution to Finland's low mineral income, makes at least one claim to being unique.

Nyhamn lies to the south of the Aland archipelago. This archipelago numbers nearly 7,000 islands and is peopled by Swedes. It was awarded to Finland by the League of Nations in 1921. Nyhamn island is just big enough to take the offices, work rooms, wheel housing, lifts, and an air compressor for the mine, together with a rail to the quay yet to be constructed.

SHORT LAND HAUL

The mine's unique quality lies in the fact that the ore will be brought from the minehead to the quay and dumped direct into ocean-going vessels. Thus it will be able to claim, when it starts producing 60 per cent iron ore in three years' time, that it has the shortest land haul in the world. Rock excavated from the shaft and from the drive to the orebody, which lies two miles to the south under the sea, will be used to make harbour walls and breakwaters. The shaft will be sunk 300 metres (about 1,000 ft.) through the island's red granite before driving can begin. The shaft will contain two cages and an emergency stairway.

The driveway to the orebody will have three lanes, two for the ore and one for personnel. It is early to say what the mine's output will be, but it has been estimated at 300,000 tons a year and that 300 men will be permanently employed.

The company developing the mine is Vuoksenniska of Helsinki. Initial costs have been heavy because all necessary equipment has been transported by sea. Food and housing materials have been brought from the Aland capital of Mariehamn.

The islands have never had a mining tradition and the company has had to choose between importing labour and training the islanders in the work. In consideration of the latter possibility, the social aspect of the new mine must also be considered by the Finnish company. The Alanders are very nationalistic and do not like Finnish intrusions. They fear that the mine will bring more Finns to the islands and create a minority problem within an island group that already represents this identical problem.

The first appeal for labour from Vuoksenniska was, however, met with enthusiasm.

The ore obtained is expected to be similar in quality to the ore of central Sweden.

Prospecting and Mining in Eire

injections of Canadian capital and technological know-how have stimulated the revival of Eire's mining industry, resulting in the re-opening of mines which have been idle for many years and the discovery of further mineral resources regarded as potentially economic. The following article describes these developments.

The "Invasion" by Canadian mining interests is being encouraged and assisted by the Government of Eire, whose attitude towards the exploitation of the country's mineral resources is more constructive and realistic than that of the U.K. A Bill introduced last year, which has now passed the committee stage, grants tax exemption on all new mining enterprises for the first four years following initial development operations.

As previously indicated in *The Mining Journal* (2/3/56, p. 256), this legislation was closely linked with negotiations concerning the establishment of a new copper mining company at Avoca, County Wicklow, by a Canadian firm, the Mogul Mining Corporation of Toronto. The Avoca group of mines was worked from 1790 to the end of the nineteenth century. The new company formed to exploit them is known as St. Patrick's Copper Mines Ltd. and will eventually mine at a rate of 1,000,000 tons a year. A first charge on profits is a 4 per cent royalty on operating profits up to £35,000, rising to 9 per cent on profits over £175,000. The Government of Eire reserves the right to purchase 50 per cent of the metallic products. A lease for 21 years was executed on January 3, 1956. It transfers the right to mine copper, lead, zinc, pyrites and other minerals over an area of 6,900 acres.

NEW LIFE FOR OLD MINES

According to Mr. H. D. Forman, managing director of St. Patrick's Mines, overall expenditure on the Avoca mines is estimated at about \$8,000,000. Tests have revealed that the deposits consist of low grade ore but are very large. Work started about eight months ago and the engineering and planning phases are now complete. The company hopes to be in active production before the end of 1958.

The Mogul Mining Corporation has also secured a mining licence to prospect old copper workings near Bonmahon, County Waterford, where test borings are to be undertaken in the near future. The Bonmahon Mines have not been worked for more than half a century. They are regarded as low grade deposits, but are fairly widespread.

Much speculation has been roused by a recent statement of the chairman of Silvermines Lead and Zinc Company of Shallee, County Tipperary, that overtures had been made by St. Patrick's Mines Ltd., of Avoca, in regard to this property. The mines were re-opened eight years ago and an extensive development programme is reported to be planned. The company has already deepened the main shaft and excavated pump chambers and ore bins and an HMS plant should be in operation within a few months. In the past two years new plant and equipment to the value of £120,000 have been installed. So far an estimated £600,000 has been expended on development work, part of this expenditure being financed by a Government loan of £120,000 made some three years ago. Production is currently at the rate of some 123,000 tons of ore annually, the bulk of which is being exported. Lead production is at present in the region of 150 tons a month. Small quantities of silver are also being recovered.

The Government has approved plans to develop an area of 50 sq. miles at Castleblaney, County Monaghan, and an area of 10 sq. miles at Beuparc, County Meath, both of which were formerly mined. These areas will be exploited by the recently established Mining Corporation of Ireland, which is a joint Irish-Canadian company. The

parent company, Can-Erin Mines of Toronto Limited, has a capital of \$5,000,000. The mines, which have been closed for nearly 50 years, are reported to have large deposits of good quality zinc and copper ores, which are being examined by the firm's senior geologist, Mr. James D. McCannell, of Toronto.

In their agreement with the Eire Government Can-Erin Mines are committed to spend \$100,000 on initial test borings for copper, but it has been stated that the group is prepared to spend \$5,000,000 on developing both mines. A large force of Irish labour will be employed and will be trained by Canadian experts. Drilling operations are being sub-contracted to the Cementation Company of Ireland Ltd. Test borings were expected to begin at Beuparc on May 1 and might last from one to three years. The setting up of smelting plant and concentrators will depend on the extent of the copper deposits.

Officials of Can-Erin recently visited the Allihies area of West Cork to examine old copper workings. At the height of production some 2,000 people were employed at the Allihies Copper Mines, which were worked for more than a century, and in 1838 copper ore valued at £74,879 was mined there and exported to Swansea for processing. Mr. McCannell said that a chunk of ore he had found in an old dump in this area was about 20 per cent copper.

Mr. N. T. P. O'Sullivan, an official of Can-Erin, stated that a new company, the Emerald Isle Mining Corporation, with a paid up capital of £50,000, would be formed to exploit the old workings at Allihies. While it is primarily interested in these mines, Can-Erin has obtained mining concessions over 200 sq. miles in West Cork. Borings are shortly to be undertaken to determine what lies below the greatest depth of the old borings, which went to 1,800 ft. About \$250,000 is to be spent on the initial boring tests. Canadian and Swedish drilling equipment will be used. Should sufficient quantities of ore be indicated, some \$3,000,000 will be available for equipment and for the sinking of new shafts. Experimental drilling for copper is expected to be completed in about six months and it is hoped that the mines will have a capacity production of some 500 tons of ore daily, providing work for about 1,000 men. A German firm has expressed interest in the smelting of any ores produced.

Traces of asbestos have been found on the site of the Allihies workings and the possibility of exploiting this mineral is to be examined.

At Glendalough, in County Wicklow, a mining company is about to add flotation units to its present mill to increase the output of lead and zinc concentrates. Development has shown that the veins being mined continue to 100 ft. below adit level.

GROWTH OF MINERALS CONSCIOUSNESS

Indicative of the extent to which Eire is becoming "mineral conscious" was the news that a deputation from Sligo County Council was to meet the Eire Minister for Industry and Commerce to request that a survey be taken immediately of mineral deposits in the County. Officials of the Council were reported to be holding talks with representatives of two mining companies already established in Eire, in an effort to induce them to promise exploitation of mineral deposits following completion of a survey. The

Abbeytown Mining Company, a J.C.I. subsidiary, already operating in County Sligo, is making satisfactory profits and development has shown an appreciable improvement in grade of ore.

An aerial survey of certain areas in County Mayo is to be undertaken shortly by a group of Canadian mining experts with a view to exploring its mineral resources. A specially-equipped aircraft will take instrument readings of

Achill, the Ox Mountains and the Erris districts.

Recently the Minister for Industry and Commerce said that this region had already been the subject of a survey by the Geological Survey Section. He added that the information obtained would be brought to the notice of any group interested in undertaking mineral exploration or development work in the region. Deposits of copper and lead are known to exist in north County Mayo.

Asbestos in Western Australia

It was announced recently that the Commonwealth of Australia was to subsidize for twelve months the production of blue asbestos at Wittenoom, Western Australia. The following article briefly describes the reasons for the granting of the subsidy, as well as its terms of operation.

The Wittenoom blue asbestos deposit is the only important known occurrence of this mineral in Australia. For descriptions of the deposit and the method of treating the fibre, readers are referred to our issues of June 13, 1952, and August 8, 1952. The reserves occupy a strip of country between 70 and 80 miles long and a mile wide, set on the northern side of the Hammersley Range. They are estimated to contain 344,000 tons to the sq. mile. Mining was started during the last war with the co-operation of the Commonwealth and State Governments.

TERMS OF THE SUBSIDY

As previously reported in this journal, Australian Blue Asbestos Ltd., a subsidiary of Colonial Sugar Refining Co. Ltd., has taken over the field and has been spending considerable sums in preparation of a large output. Production has approximated 6,000 tons of fibre and results have been marginal, but improvements in mining methods and treatment, together with a better overseas market, should strengthen the position of the industry.

Australian Blue Asbestos Ltd. will now receive £5 for each ton of its fibre despatched from Wittenoom. Payment of the Commonwealth subsidy will be made through the State Government of Western Australia. A maximum amount of £30,000 has been fixed thus enabling 6,000 tons to qualify for the subsidy. Payments will be made on production for the 12 months ending September 30, 1956. These rates and conditions of subsidy are the same as granted to the company by the Western Australian



An electric railway track penetrates the main drive into the deposit

Government. The company will, therefore, receive total subsidy from both sources of £10 per ton up to a limit of 6,000 tons.

The Commonwealth's decision was made after receiving a request from the Premier of Western Australia that the Commonwealth should match the State's assistance.

The company has been largely dependent upon developing export markets for its product. It has accumulated substantial losses and up to June, 1955, its capital investment plus losses amounted to more than £2,000,000. However, the company has made vigorous efforts to develop its overseas markets and has increased its exports from 600 tons in 1951 to 8,000 tons in 1955. It expects to export 12,000 tons in 1957.

NATIONAL AND LOCAL IMPORTANCE

In deciding to join with the State in assisting this enterprise, the Commonwealth had in mind that mineral resources provide the best chance of developing the sparsely populated areas in the inland parts of Northern Western Australia. The township of Wittenoom is wholly dependent on the mine and the Commonwealth and State Governments have investments of almost £500,000 in housing and other assets surrounding the mine upon which substantial losses would be incurred if the venture failed.

The Commonwealth also had considered the fact that the asbestos mined at Wittenoom is a substantial earner of export income, including U.S. dollars. There is also strategic value in a local supply of asbestos fibre. Supplies from Wittenoom in war-time could be assured only if normal commercial production is maintained.



The crushing plant at Wittenoom Gorge

Some Applications of Bearings in the Mining Industry

In the mining industry, bearings find their largest fields of application in conveyors and trucks, although they are also essential components of other machinery and mechanical equipment operating on the surface or underground. The following article describes those bearings supplied by SKF for various applications in mine belt conveyor systems and in coal mining machinery. In a subsequent issue the employment of bearings in mine transportation equipment of all types as well as in ventilation fans will be described.

Bearings may be defined as supports provided to hold revolving shafts in the correct position, and the performance and life of machinery depend on the carrying capacity of the bearings and the design of the bearing arrangement. Mine conveyors make heavy demands on the carrying capacity of the bearings under difficult operating conditions, although at the other extreme, a conveyor for letters in a post office has small bearing loads and the conditions are more favourable.

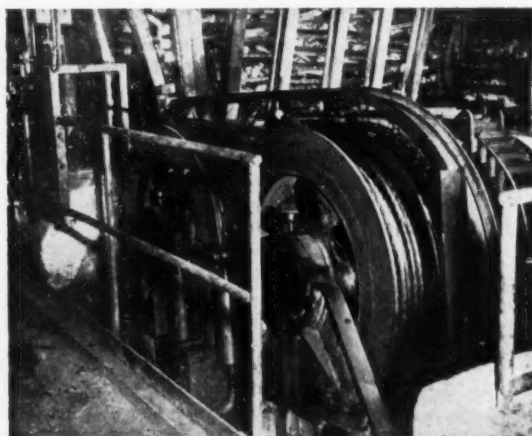
Performance also depends on the quality and accuracy of the bearings themselves, which are produced by precision engineering methods to very close tolerances. In



SKF equipped belt conveyor for carrying ore. All the rollers are mounted on the manufacturers' deep groove ball bearings and the end-drums in self-aligning ball bearings by the same makers

order to minimize the maintenance costs bearings should have a long life and little maintenance or re-lubrication should be required. They should be capable of giving trouble-free service even when machinery is operated by people not used to dealing with mechanical equipment.

In belt conveyors the foremost requirements are ease of running, cleanliness, reliability and simplicity of maintenance. The bearing friction must be very low in order to avoid belt slip and consequent wear of the belt. There must be no leakage of oil from the bearings, since this can be detrimental to the belt and, under certain circumstances, may constitute a fire hazard. Effective seals and grease-lubricated bearings make risk of lubricant leakage negligible.



This 2-drum winch for driving bucket scraper boxes is fitted with SKF roller bearings. The winch was built by Gusto Mijnbouw, Schiedam, Holland, and is in service with the National Coal Board in Durham and other divisions

The bearing arrangements for rollers and end-drums depend to a large extent on the design of the conveyor and the conditions under which it operates. The bearings for the troughing rollers may either be placed outside the rollers or be mounted in the roller ends. In the former case the journal rotates in the bearing, which is mounted on the frame, while in the latter case, the journal is fixed in the



Belt conveyor for carrying concentrates. The rollers are mounted in deep groove ball bearings and the end drums in self-aligning ball bearings

frame and the outer ring of the bearing rotates with the roller.

Ball bearings are generally used both for belt conveyor troughing rollers and return rollers. In conveyors intended for very heavy material or exposed to heavy shock loads it may be necessary, however, to use taper or spherical roller bearings in the rollers. Unlike the other types of bearing mentioned above, taper roller bearings must be mounted in pairs. For return rollers which have light loads, ball bearings generally have sufficient carrying capacity. End-drums are fitted either with ball or roller bearings according to the magnitude of the loads; standard plummer blocks can often be used. Bearings mounted in detached housings must be self-aligning in view of the deflections which occur and the difficulty of lining up the housings.

An example of a belt conveyor for carrying concentrates shows the width of belt to be 24 in. and the speed 197 ft./min. The rollers are mounted in deep-groove ball bearings on fixed spindles bolted to the frame and the end-drums in self-aligning ball bearings. A similar construction is adopted for a belt conveyor for carrying ore in which the length of the belt is 220 ft., the width 24 in. and the speed 315 ft./min. The diameter of the rollers is 6 in., the slope of the conveyor 18 deg., and there are 55 idlers, 21 return rollers and 2 break rollers. The power consumption of this unit is 25 h.p.

Often cast iron or steel tube is used for the rollers of belt conveyors, and these are mounted on fixed or rotating spindles. In the former case the ends of the rollers form part of the bearing housings, and in the latter the housings are fixed to the frame. In a typical construction the troughing rollers, made of steel tube with cast ends, are mounted on stationary journals. The inner rings of the bearings are mounted with a sliding fit on the journals and the bearings are adjusted with shaft nuts. Effective sealing is obtained with pressed steel washers, inserted alternately in the housing and on the spindle. The bearings are grease-lubricated, ducts to the two bearings of the idler leading from one grease nipple. The return rollers are fitted with the same bearings in order to use only the one type of bearing throughout the conveyor.

TROUGHED AND FLAT STEEL BELTS

In the case of troughed steel belts, the troughing rollers are carried in cradles so that they can adjust themselves to the sag of the belt. The cradles are bolted to a pair of transverse flat springs which are supported at each end on



Belt conveyor troughing rollers for steel belt

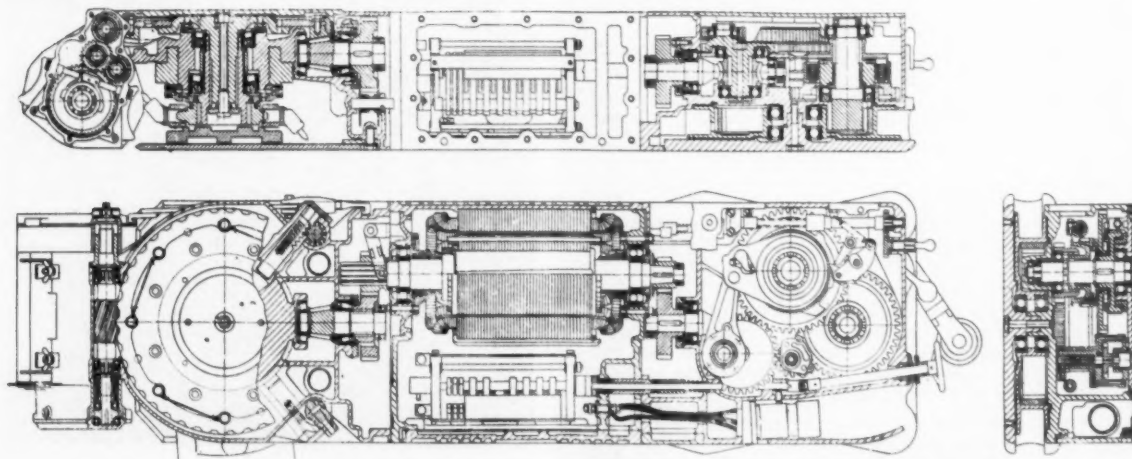
a pair of rockers. The advantage of this design is that the belt can adjust itself according to the load it is carrying.

For flat steel belts, the supporting rollers consist of a shaft with four fixed pulley-type rollers. The journal rotates in ball bearings with the housings fixed in the frame. To guide the steel belt sideways some of the supporting rollers have guiding flanges.

If the end-drum is provided with a tensioning device, the bearing housing must be designed accordingly; e.g., it may be mounted on slides with adjusting screws to regulate the belt tension. When automatic regulation of the belt tension is necessary—i.e., with very long belts—the end-drum is mounted in a cradle and the belt is tensioned with weights.

COAL MINING MACHINERY

The cross-sectional drawing of a 15 in. Samson coal-cutter gives an impressive indication of the extent to which bearings are used in coal mining machinery. This machine, manufactured by Mavor and Coulson Ltd., is a typical example of the longwall type of equipment used in Britain by the National Coal Board. It is equipped with more than 50 ball or roller bearings. An interesting feature of the design is that only three bearings need to be dismantled from their shafts when the machine is dismantled for inspection or overhaul. These are the ball bearing at the foot of the crank-disc shaft, the roller bearing at the top of the ratchet-wheel shaft, and the roller bearing at the top of the safety-clutch shaft.



Sectionalized drawing of Mavor and Coulson 15 in. Samson coal cutter showing the SKF ball and roller bearings with which it is fitted

MACHINERY AND EQUIPMENT

Safety Lamps for Dangerous Atmospheres

Two new lamps for use in dangerous atmospheres have been developed by Nife Batteries. Based on the Nife miner's caplamp for colliery use, the lamps can be operated with perfect safety in heavy concentrations of hydrogen, coal gas, coke oven gas, blue water gas and other gases of the pentane and petroleum groups. The lamps are approved for this purpose by the Chief Electrical Inspector of Factories and meet the requirements of Home Office Specification JCDD/21 for use with fire brigades' breathing apparatus.



The new Nife hydrogen caplamp

The first of the two lamps is designed to be worn on a helmet or suitable cap. The toughened plastic headpiece is connected by a flexible lead to the stainless steel battery case at the waist. The other is similar in every respect except that a handle enables it to be used as a handlamp.

The main bulb, a 1 amp. Krypton gas-filled type, is fitted into a specially designed reflector to provide an intense beam with wide angle diffusion. An alternative pilot bulb of low

consumption conserves battery

capacity when necessary. Power is supplied by a Nife high capacity nickel cadmium alkaline battery of three cells with a capacity of 12 Ah. Ideally suited for this type of work, it couples an unusually long life with the capacity to stand idle for long periods without deterioration. It is therefore available for immediate use in any emergency. The lamps are suitable for use in metalliferous and coal mines.

A New Coal Hoister

A new system of raising coal to the surface in coal mines could reduce the pithead price by 7s. a ton. This would mean a saving of £14,000,000 to industry on its annual coal bill if this system is generally adopted.

This claim is made by Mitchell Engineering Ltd., designers of an improved hoisting system employing bucket conveyors. This system would require only one-fifth the power normally employed in raising coal and only 10 per cent of existing labour forces.

A saving of 7s. a ton on the pithead price of coal could mean a 5-10 per cent reduction of all electricity expenditure.

The Mitchell system can be used at any depth underground and can lift 50 to 500 tons of coal an hour. Cost of installation would depend on the site but would be less than half the cost of existing systems. The handling of the coal is also considerably speeded up as the buckets carry the coal into the receiving hopper of the washer. It is then carried automatically through the washery and delivered to the railway wagons with a minimum of supervision. The problems usually associated with coal hoists, namely the stretching of the chain and the difficulty of lubrication, have been overcome. Stretching of the chain occurs when the buckets are turned over for emptying. With this system they are opened. Also the load being hoisted is balanced to further avoid stretching of the chain and to reduce power required. The need for lubrication has been overcome by having all bearings enclosed.

The coal hoister consists of a series of bottom-opening buckets suspended between two strands of double link steel chain. They are filled by a rotary plate filler designed so that each bucket is filled with its rated load without spillage. The buckets are discharged at the top by rollers attached to their

sides engaging with a moving chain which lifts the bucket and allows the doors at the bottom to open to completely discharge the contents.

The driving gears are arranged at intervals on the vertical run of the conveyor. At each of these points the loaded strand is driven from an electric motor and, in order to reduce the power required, the drive is coupled to a drive on the unloaded strand by means of an epicyclic gear.

The buckets are loaded by means of a rotary plate filler consisting of a circular mild steel plate of large diameter arranged to rotate horizontally immediately above the path of the buckets. The material delivered to the table is discharged to the buckets through holes in the plate, the periphery spacing of which is arranged to coincide with the pitch of buckets. The radial path of the holes being also arranged coincident with the centre line of the bucket path.

The buckets are discharged by means of the rollers at each side of the buckets engaging with moving chains located at the discharge point.

As the buckets come under control of the discharging chain the action is such that they are lifted vertically from the pivot studs and the hinged door retaining links permit the doors to open sufficiently to allow the contents to be completely discharged.

Increasing Use of Flexible Tubing for Mine Ventilation

It will be recalled that in our issue of May 18, 1956, the use of a new flexible tubing for ventilating new workings and headings in mining operations was described. The tubing, designated 5740 Ventube, was announced by the Fabrics and Finishes Department of Du Pont de Nemours and Co., and is in excellent condition after two years of service at the Butte, Montana, operations of the Anaconda Co.

Additional information lately received reveals that over 500,000 ft. of 5740 Ventube are now in use, an increase of over 300,000 ft. above the 1955 total. Of this footage, more than 100,000 ft. have been in service for periods exceeding two years. None of the installations show indications of failure and although the maximum service life is not yet known, it is obviously more than two years under average conditions.

Indeed, the field testing of 5740 Ventube as a replacement for metal ducting is proceeding with every indication of success. New installations increase at a rate greater than 2,000 ft. per month.



Ventube clearing the air immediately after the blast in Anaconda's underground operations at Butte, Montana

MINING MISCELLANY

The possibility of a large-scale copper development in the La Ronge area of Northern Saskatchewan is foreseen. The Premier, Mr. T. C. Douglas, has been quoted as stating that the Government of Saskatchewan would provide any necessary guarantees for the construction of a railway line into the area.

Atlas Copco, the world's largest group devoted exclusively to the manufacture of compressed air equipment, has acquired the controlling interest in Arpic Engineering S.A. of Belgium. Since 1946 Atlas Copco, with headquarters in Sweden, has



The exterior of Arpic's main factory near Antwerp, Belgium

expanded from three to 26 companies overseas. The group now has factories in Great Britain, Canada, South Africa and Finland. Arpic is a Belgian organization with companies in Great Britain, Mexico and Bolivia. In 1952 it completed Europe's most modern portable compressor factory near Antwerp. It also has a plant in Scotland and a network of agents and distributors throughout the world.

The ore mine Matylda, in Cracow voivodship, Poland, which was twice flooded during the inter-war period, is being prepared for renewed exploitation.

Rio Tinto (Australia) will undertake an immediate search for minerals over about one-seventh of Tasmania. About £A500,000 will be available for the initial investigation.

According to reports reaching Vienna a huge haematite-siderite deposit with inclusions of lead ores and barytes has been found near Sofia, Bulgaria. The ore lies close enough to the surface to permit open cast mining.

Deposits of about 200,000,000 tons of coal and oil shale have been discovered in Kansu Province in north-west China. According to the New China News Agency mines will be built in this area as soon as geological prospecting has been completed.

The Turkish Statistical Office has announced that during 1955 the country exported 12,054 tons of copper in ingots worth some ££24,500,000, of which 6,600 tons went to West Germany. Antimony ore shipments amounted to 1,186 tons and exports of manganese ore to 31,771 tons.

In co-operation with the Science Museum, South Kensington, London, the British Iron and Steel Federation is to create a new ferrous metallurgical display in the Museum to commemorate Sir Henry Bessemer. For this purpose the sum of £50,000 has been allocated. It is hoped the gallery will be completed within three years.

A company known as Mountain Lead Mines Ltd. has been formed in Hong Kong to invest in lands, mines and mineral rights, etc. It has a nominal capital of \$1,000,000 and the directorate comprises some leading local European business men. It is believed that the company will start early operations on a hitherto unworked and possibly important vein of ore.

At the annual general meeting of the Rhodesia Chamber of Mines, held in Bulawayo on April 27, the Minister for Mines, Mr. C. J. Hatty, announced that he proposes to arrange for a thorough investigation of the pegmatites, which occur throughout the colony. The encouraging results being obtained at Kamativi and in the Belgian Congo certainly warrant such action.

An American concern has purchased the shares of the Greek Bank of Chios and with them the shares of the Atlanti Mining Company, which is exploiting iron ore on the island of Tsouca.

Deposits have been estimated at 10,000,000 tons and the mine, which will employ 500 men, is expected to ship 300,000 tons a year to Western Germany.

The mining industry in Southern Rhodesia, which consumes nearly 50 per cent of the total power, is considerably alarmed by a recent announcement that the Southern Rhodesia Electricity Supply Commission proposes to increase its rates by 15 per cent. It is considered that the surcharge will be the death knell of some of the older gold mines and members of the industry have asked for a Commission of Inquiry.

The Bell Bay aluminium works is now producing ingot at the rate of about 10,000 tons per annum and is supplying 45 per cent of Australia's virgin requirements. It came into production in the nick of time to prevent a serious dislocation of Australian industry. Production will be raised to the planned output of 13,000 tons per annum as soon as sufficient electric power is available.

The planned expansion of Chilanga Cement Ltd. at Lusaka is now completed. The second kiln was opened officially on May 25, 1956, by H.E. the Governor of Northern Rhodesia, Sir Arthur E. T. Benson, K.C.M.G. It will bring the capacity to 200,000 tons per year, which compares with 90,000 tons in 1955. In addition to funds provided by the Colonial Development Corporation and the Premier Portland Cement Company (Rhodesia) Ltd., a substantial part of the new capital required for the expansion has been supplied by Rhodesian Anglo American and the British South Africa Company. The company has secured a contract for supplying cement for the preliminary construction work of the Kariba hydro-electric scheme.

Described as one of the world's most valuable plots of land, the El Cerro del Mercado—the Iron Mountain—at Durango, Mexico, is estimated to hold at least 600,000,000 tons of almost pure iron, most of which juts out 700 ft. above the surrounding plains. The iron mass, which is loaded into trucks by Caterpillar No. 6 Traxcavators, extends for nearly one mile, with a width of about 2,000 ft. The No. 6 Trax-



El Cerro Del Mercado. With ore averaging 60-75 per cent pure iron, this is probably the most valuable plot of land in Mexico

cavator, operated by Cia. Fierro del Norte, loads 1,000 tons of ore in an eight-hour day. The ore is carried from the mining area by rail.

Goodyear Stacker conveyor belting is playing an important part in handling the huge quantities of aggregate used in the construction of the Mauvoisin Dam, which is being built in the Pennine Alps of Switzerland, about ten miles (as the crow flies) from the famous Matterhorn. This dam is being constructed entirely of concrete. The crushing and grading plant stockpiles are necessarily placed in the valley, but the mix is required at a point approximately 1,000 ft. higher up the mountainside. To reach this point a tunnel was driven inside the mountain in four flights of 1,000 ft. at 1 in 4. The main belt from the stockpiles and one of the four sloping belts were diamond-spliced in their tunnels under the supervision of Goodyear engineer Mr. Roy Middleton. Rock taken during the driving of the tunnels has been used as aggregate, but the main supply is taken from higher up the valley floor and conveyed to the pre-crushing plant by Euclids and Macs. After crushing and grading it is fed on to stockpiles by a series of conveyors. The main 48 in. conveyor runs from the silos, under

the stockpiles, and so on to the foot of the first incline. Materials are fed on to the belt at a pre-determined rate, followed by aggregate of the required sizes. The dry constituents are carried up the four flights and emerge from the mountain side 1,000 ft. higher up. There they pass into five mixers which discharge into buckets carried on an aerial ropeway spanning the valley. The ropeway is adjustable to permit the concrete being placed at any point required.

Plans have been announced for doubling coal output at the Norwegian mines in Spitsbergen in the next six years. The mines at Ny Alesund are to be restarted after being closed for three years. The Norwegian Parliament has voted almost £900,000 for a modernisation programme for the mines, and it is hoped to achieve an output of 200,000 tons of coal a year compared with 80,000 tons formerly. At the other mining settlement, Longyear City, output is to be increased from 300,000 to 400,000 tons a year. From 1962 the total output should be 600,000 tons a year.

The French-American firm, "Comilog," in which the United States Steel Corporation owns an interest, is aiming at exploitation of manganese deposits in North Gaboon, French Equatorial Africa. It is believed that if transportation is by rail, the company could export about 500,000 tons of ore instead of an estimated 300,000 tons per year. Negotiations for construction of the railway may be protracted and difficult. An alternative plan provides for the construction of an aerial tramway system to convey the ore.

During Poland's Five-Year Plan (1956-60), about 60 open-cast coal mines are to be established in the Stalinogod, Wroclaw and Cracow voivodships. Their joint production will amount to almost 20,000 tons of coal daily. There are now 16 shallow mines under construction, six of which will start production this year. The Five-Year Plan provides for the expenditure of considerable sums on the expansion and modernization of safety and hygiene facilities in the Polish coal industry.

The U.S. Steel Corporation is reported to be looking over a large low-grade iron ore prospect in north-eastern Quebec for possible development. Preliminary surveys of the mining properties indicate the presence of ore running approximately 30 per cent iron, which would require beneficiation. The Corporation's subsidiary, Cartier Mining Co., Ltd., has been carrying on an investigation for some time. It now has mineral holdings in the Mount Wright and Mount Reed areas near the Labrador-Quebec border.

Henry Wiggin and Company Ltd., a wholly-owned subsidiary of Mond Nickel have purchased the specialized high nickel alloy fabricating plant at Hereford, which they designed and erected for the Ministry of Supply and have been operating since 1954.

The Agusan Consolidated Mining Co. has reported the discovery of rich copper ore in its gold, silver and lead mines at Cabawan, Rosario, Agusan, in the Philippines. The ore, which has an average copper content of 10 per cent, is said to be parallel to and near the gold-silver veins at present being developed for milling operations.

Gold veins found in the Krabinburi district of Thailand, about 100 miles north-east of Bangkok, are being worked by the Ministry of Industry. They are reported to be yielding 250 grammes daily of 96/97 per cent purity from 25 tons of ore-bearing rock annually pulverized. It is said that so far 10 kg. of pure mineral have been extracted from these deposits. The aim is to pulverize 100 tons of rock a day by introducing machinery, but operations are hampered by lack of funds.

The Shamva mine, which at one time was the biggest gold mine in Southern Rhodesia, is to close within a month or two because the recovery of gold is no longer economic. Claims on this property, originally known as the Lone Star, were first pegged in 1903 and gold was first produced in 1912. The mine was closed down in 1930, but in recent years it has been operated on lease by Shamva Tributors Ltd.

PERSONAL

Mr. H. C. Koch has been appointed a director of Anglo American Corporation of South Africa, Ltd.

Mr. J. M. Carr, O.B.E., has resigned from the boards of Ashanti Goldfields Corporation, Ltd., Bibiani (1927), Ltd., and A.G.C. (Timber), Ltd. Mr. R. G. H. Linzee, C.B., C.B.E., has joined the boards of these companies.

Austral Development Ltd. has announced the following changes in the board of directors of Broken Hill South Ltd., and of its wholly-owned subsidiary, Barrier Central Pty. Ltd.; Mr. G. Lindesay Clark has been appointed chairman in place of the late Sir Alexander Stewart. Mr. Harry Wilfred Buckley has been appointed managing director. Sir Sydney Snow has resigned. Mr. Wilfred D. Brookes has been appointed a director.

Mr. G. McCall Corbett, Mr. Ronald E. G. M. Manners-Clark and Mr. George J. Staveley have been co-opted to the board of Rukuba Tin Mines. Mr. S. Bayliss Smith has resigned from the board.

Mr. Robert H. Lyddan has been appointed assistant director of the U.S. Geological Survey.

Dr. Wojciech Domzalski has joined Hunting Geophysics, Ltd., as the chief geophysicist.

Mr. J. B. Longman has been appointed technical sales representative of the Baird and Tatlock group of companies for South London and South-East England in succession to Mr. P. H. D. Andrews, who is returning to South Africa.

Mr. Austin Skromme, design engineer at Caterpillar Tractor Co., Peoria, Illinois, has been appointed to the engineering staff of the company's British subsidiary, Caterpillar Tractor Co. Ltd.

Scientists from 14 countries will meet in Namur, Belgium, for the world's first international congress on automation and robot science, to be held from June 26 to 29.

CONTRACTS AND TENDERS

The following future authorizations have been announced by the International Co-operation Administration (I.C.A.).

	Contract Period	Terminal Delivery Date	Amount (in U.S. dollars)
Pakistan			
Aluminium and aluminium base alloys and aluminium products (PA No. 91-693-99-A6-6229)	30/4/56-30/9/56	31/12/56	1,700,000
Tin and tin base alloys and products (PA No. 91-696-99-A6-6233)	30/4/56-30/9/56	31/12/56	150,000
Copper and copper products (PA No. 91-692-99-A6-6230)	30/4/56-30/9/56	31/12/56	140,000
Miscellaneous industrial non-ferrous metals and their products (PA No. 91-698-99-A6-6235)	30/4/56-30/9/56	31/12/56	100,000
Lead and lead base alloys and their products (PA No. 91-694-99-A6-6232)	30/4/56-30/9/56	31/12/56	100,000
Zinc and zinc base alloys and zinc products (PA No. 91-697-99-A6-6234)	30/4/56-30/9/56	31/12/56	100,000
Iran			
Aluminium and aluminium base alloys and products (PA No. 65-691-99-A5-6234)	30/4/56-30/9/56	31/12/56	300,000
Copper and copper products (PA No. 65-692-99-A5-6229)	30/4/56-30/9/56	31/12/56	300,000
Construction, mining and conveying equipment (PA No. 65-740-99-A5-6247) ..	30/4/56-31/10/57	31/10/57	160,000
Turkey			
Aluminium and lead, their base alloys and their products (PA No. 77-99-A5-6250)	30/4/56-31/8/56	28/2/57	300,000
Tin and tin base alloys and products (PA No. 77-696-99-A5-6254)	30/4/56-30/9/56	31/12/56	250,000
Non-metallic minerals (except petroleum) and non-metallic mineral products (PA No. 77-99-A5-6251) ..	30/4/56-30/8/56	30/4/57	200,000
Construction, mining and conveying equipment (PA No. 77-740-99-A5-6258) ..	30/4/56-31/10/56	31/10/57	118,000
B.O.T. Ref. ESB/13443/56/I.C.A. Telephone enquiries to Chancery 4411, Extension 360.			

METALS, MINERALS AND ALLOYS

COPPER.—The world copper situation is virtually unchanged. The basic facts are that the big American producers are still quoting 46 c. per lb.; the custom smelters 40 c.; and London is fluctuating fairly freely around £300.

London's recovery—a jump of £9 5s. in a day took it back beyond £300—is attributed to Russian buying superimposed on a market which does not know where to look next for a lead. The custom smelters are staging a pause for recollection (they have staged two similar pauses in the present down term, one at 50 c. when the price first broke and another longer one at 45 c.). They see no need to sacrifice themselves by slashing the price further for they are comfortably under the umbrella provided by the big producers; on the other hand if demand continues to dry up they may have no option but to quote lower. As so often is the case the big American producers hold the key to the situation.

They would doubtless like to see the wage negotiations off the way before making a cut which can only touch off a further general decline. But they probably have in their minds much more the difficulties of Chile and the delicacy of current negotiations of the Chilean Government. After all, the big American producers really do want to see copper at a substantially lower price, although their actions often appear to deny it, and they would like a floor of 35 c. which is higher than London's expecting and indeed is only a little below some of London's recent quotations. For the Chileans, however, the fall in copper could not come at a worse time. Severe credit restriction and price and wage stabilization have been decreed. The fall probably means that these measures will have to be intensified if Chile is to live within a much lower rate of foreign exchange earnings than she had when they were first installed. Of course, Chile (or at least her economic advisers) recognize that copper cannot be sold indefinitely at 46 c., but she also feels that if she can play for time her economy might be in a position to face the shock of a fall in copper.

Chile has to take account, in credit restriction, of not only what is economically desirable, but what is politically possible.

These considerations may also throw some light on an extraordinary production forecast made by the Chilean government's copper department of 520,357 tonnes which is one-third above the official 1955 figure of 391,246 tonnes. In fact, Chilean output up to the end of May was 167,851 tonnes against 174,701 tonnes in the same period of 1955. It looks very much as if the Chilean Government is trying to get a *quid pro quo* from the Americans; but they will consent to a reduction from 46 c. if the Americans will substantially raise their level of output to try to maintain Chilean economic stability.

Meanwhile such news as is available in the United States is primarily of the difficulties among fabricators. The brass mills of Olin Mathieson Chemical Corporation have laid off 500 workers and are re-arranging their operations; Chase Brass and Copper Company is putting its Waterbury plants on a four-day week; Scovill Manufacturing Company is running some of its departments on a four-day week; Bridgeport Brass Company has suspended operations at some plants, extended a holiday at others and laid-off a number of workers; Revere Copper and Brass have also extended the holiday and laid off workers and the American Brass Company have cut out all overtime.

A sidelight on the unreal price structure is offered by the fact that some customers of Brass Mills have been buying custom smelter metal at 40 c. and having it processed in the Brass mills on a toll basis in order to avoid getting 46 c. copper from the brass mills themselves.

LEAD.—There have been only occasional bursts of activity in lead buying in the United States in the past week. Generally, conditions have been dull with the price quoted remaining unchanged at 16 c. per lb. Sales of domestic lead during the week ending May 30 slumped to 5,461 tons from the figure of 11,827 tons from the preceding week. This latter figure was the best weekly tonnage sold since January and some fall was therefore inevitable; since the latter week included the Memorial Day holiday, the fall was not so bad as it appears. It is reported that G.S.A. bought around 9,000 tons for the stockpile in April which is only about 1,000 tons below the rate ruling when the present stockpiling programme was initiated. No change is expected in the market while stockpiling can be kept up to this level unless renewed weakness in London undermines the New York level.

TIN.—Tin was a rather featureless market for most of the past week in the United States with the price of prompt metal tending to slip downward. Occasional dealer buying provided

the only interest. Until the steel industry wage negotiations are out of the way a clear trend is not to be expected. A sudden rise was caused however both in London and New York by a report emanating from the Continent that the American authorities had contracted for between 5,000 and 8,000 tons of tin concentrates for operations at the Texas Smelter up to January, 1957. This report has yet to be confirmed but it means, if true, that a decision has been taken to keep the smelter working at a rate which will remove the statistical surplus from the tin market. This, in turn, means that tin at its price of the recent past is too cheap. Indeed one of the causes of the recent downturn has been a widespread suspicion that the smelter would be kept going on a minimum of concentrates and that a statistical surplus would be turned into a genuine surplus during the second half of the year. Again, if this report is true, it means that the I.T.A. will have the task of acquiring metal for the Buffer Stock in more stringent circumstances than has recently been expected.

Word consumption of tin metal in March was 13,800 tons, of which 5,700 tons went into tinplate. The consumption figure is the highest for any month since August, 1950. United States consumption increased from 5,250 tons in February to 5,405 tons in March. World tinplate production reached 834,000 tons during March—a new monthly record. Mainly responsible for this high level was an American production figure of 635,166 tons, itself a monthly record. The outputs in France (30,246 tons), Belgium (9,804 tons), and the Netherlands (5,980 tons) also established new monthly records.

ZINC.—Zinc has remained quoted at 13.50 c. per lb. East St. Louis for prime western grade but the market has had another poor week. The buying of special high grade metal is continuing slight in view of the very big cutbacks in automobile output. There is no point in looking for any improvement from these customers for another two to three months. There have been times when demand for prime Western grade has been encouraging particularly as house building appears to be getting underway again but the possibility of a strike in the steel industry has curtailed the buying of prime western grade by galvanizing, and this has merely increased the difficulties of the producers. The immediate question in the American Zinc industry is whether it can continue to hold the level of 13.50 c. in the present circumstances.

Mr. Manubhai Shah, Indian minister for industrial development has stated that a zinc smelter may be established in India if the attempt to raise the present zinc ore mining capacity of 250 tons a day up to 1,000 tons a day is successful.

ALUMINIUM.—Another large outlet for aluminium is indicated by the news that after six months of carrying crude oil through the brackish water of Lake Maracaibo, Venezuela, a 700-ft. length of aluminium pipeline was found to be essentially unaffected. Before the aluminium pipe was installed, a steel pipe had been damaged as a result of teredo attack of the protective coating, which exposed the metal to corrosive action by the water. Having regard to the rapid expansion of the oil industry and the growing extent to which its products are being piped over long distances, this field of applications is potentially very great.

ASBESTOS.—Mr. Felix E. Wormser, Assistant Secretary of the Interior for Mineral Resources, has recommended that the U.S. Government should not embark upon a programme to subsidize in peacetime the mining of sub-marginal ores. His department considers, however, that some continued assistance is needed in the case of asbestos to minimize economic dislocation and permit adjustment to competitive markets. To accomplish this, he recommended that the purchase programme for asbestos should be renewed, but that it should end not later than December 30, 1958. Quotas under the programme should be limited to 2,000 tons of crude No. 1 and 2 asbestos combined, and a like quantity of crude No. 3.

Lake Asbestos of Quebec, Ltd., which is a wholly-owned Canadian subsidiary of American Smelting and Refining Co., has been awarded a \$7,700,000 contract for the construction of an asbestos ore milling plant capable of treating 5,000 tons of ore a day. It is expected that the mill will be completed early in 1958. American Smelting plans to spend over \$32,000,000 on developing the mine, which will add about 100,000 tons of asbestos annually to Canada's rapidly expanding production. The mill will treat ore bodies that now lie beneath the surface of the Black Lake, 75 miles south of Quebec City and 130 miles north-east of Montreal. The lake is now being dredged and mining will be by the open pit method.

BERYLLIUM.—It is expected that in the near future the Atomic Energy Commission will announce contract negotia-

tions for the purchase of 250 s.tons of beryllium metal over a five-year period. Twenty-seven companies are interested in the programme, which provides for the construction of new plants. The programme calls for the delivery of 50 tons annually over a five-year period, deliveries to start prior to 1957.

CERIUM.—It was recently reported (*The Mining Journal*, 27/4/56, p. 521) that the activities of the Atomic Energy Commission were transforming the rare earths into readily available materials, these elements being essential by-products of atomic piles. Now cerium metal (95 per cent min.) has become available in the U.S. for experimental work in the metal industries. This metal is an effective nodularizing agent. Limited quantities, in the form of one-pound piglets, are offered by Mallinckrodt Chemical Works at a price of \$15 per lb.

NICKEL.—The nickel position in the U.S. is becoming more clearly defined as a result of investigations currently being undertaken by the Senate Small Business Committee and the Joint Committee on Defence Production. The Commerce Secretary, Mr. Sinclair Weeks, has said that the U.S. will receive more than 150,000 s.tons of primary nickel during 1956, equivalent to approximately 70 per cent of the total free world supply. In 1957 the supply will be higher by about 12,500 s.tons, 80 per cent of this increase coming from the \$43,000,000 expansion programme at the Government-owned nickel plant at Nicaro, Cuba. It was further stated that defence needs were being fully met and that measures had been proposed to relieve the shortages in the civilian economy. Allegations that nickel allocated for defence purposes has been going into non-defence uses through blackmarket channels are being investigated by the Senate Small Business Committee.

The U.S. Government plans to put distribution controls on nickel alloy deliveries starting in the fourth quarter of this year, which will oblige mills to set aside definite percentages of production for defence quantities. At present more metal is being taken under the priority-order system than the estimated defence need. The amount of nickel allocated for non-defence use is not subject to controls, said an ODM spokesman, and may be distributed according to the laws of supply and demand. ODM does not feel that, at the present time, the tight nickel situation could be improved by the re-imposition of controls on non-defence uses. The Assistant Secretary of the Department of Commerce, Mr. Frederick H. Mueller, has emphasized that the only cure must come from increasing overall supplies of nickel.

Mr. Henry S. Wingate, president of INCO, told the Senate Small Business Committee that his company did not plan any expansion at this time to increase its output of nickel. He pointed out that it would take approximately four years to bring into production new nickel plants, and that no one could predict defence and stockpile requirements so far ahead. Mr. Wingate also told the committee that INCO had been placed in the position of having to decide what amounts of nickel would be apportioned to users both large and small, following the relaxation of Government controls in 1953. He said his company had been unable to arrive at any definite yardstick that could be used on any segment of the industry and had therefore approached the problem on a customer by customer basis. This had resulted in considerable dissatisfaction, but no other solution had presented itself.

Freeport Sulphur plans to build an \$85,000,000 nickel and cobalt processing plant "in one of the Gulf states". Work on a pilot plant at Braithwaite, La., south of New Orleans, is expected to be completed in October. The company also plans to expand its mining operations in Cuba.

GOLD.—West German bank authorities are reported to be seriously considering minting gold coins as a device for combating inflation. It is believed that by encouraging the hoarding of gold pieces, several hundred million marks of purchasing power might be absorbed. This is a notable example of the changing attitude to gold which has been shown by a number of governments since the re-opening of the London Bullion Market in March, 1954. There have been reports that other countries were considering the minting of gold coins now that wider freedom for dealing in gold has been restored.

The London Metal Market

(From Our Metal Exchange Correspondent)

For the first time for many weeks there has been a firmer undertone to dealings on the Exchange, and it is probably due to this that the quotation for copper has risen about £20 above its lowest. There seems to be little buying on the part of consumers, and in the U.K. deliveries of physical copper are still being made to the market which have resulted in increased stocks and the elimination of the backwardation: as the grades

of copper now being delivered are not very popular it is expected that they will be retained in the market as counters and thus prevent the re-establishment of a backwardation. In America neither custom smelters nor primary producers have altered their prices, and with a hardening tendency in scrap values it seems probable that the present quotations will be maintained although custom smelters may be tempted to raise their price a little.

The tin market has been active with demand reasonably good on both sides of the Atlantic, and no considerable alteration from the present price level is expected. On Thursday morning the Eastern price was equivalent to £746½ per ton c.i.f. Europe.

The lead and zinc markets have both been active and prices have tended to harden in sympathy with the rise in the copper quotation and owing to news of renewed unrest amongst Australian dock-workers. Although the long-term outlook for both metals is uncertain, there is no doubt that at the present time there is very little surplus metal available to meet immediate requirements, and, as demand remains at a fairly constant level, should there be any sudden spurt prices will probably react violently.

Closing prices and turnovers are given in the following table:—

	May 31		June 7	
	Buyers	Sellers	Buyers	Sellers
Copper				
Cash	£293	£293½	£302½	£303½
Three months	£291½	£292	£305	£306
Settlement		£293½		£303½
Week's turnover		7,450 tons		7,150 tons
Tin				
Cash	£725	£726	£730	£732
Three months	£725	£726	£729	£730
Settlement		£726		£732
Week's turnover		880 tons		760 tons
Lead				
Current half month	£109½	£109½	£111½	£111½
Three months	£106½	£106½	£109½	£110
Week's turnover		5,875 tons		4,450 tons
Zinc				
Current half month	£91½	£91½	£91½	£92½
Three months	£89½	£89½	£90½	£90½
Week's turnover		4,725 tons		6,400 tons

OTHER LONDON PRICES—JUNE 7

METALS

Aluminium, 99.5%, £189 per ton	Nickel, 99.5% (home trade) £519 per ton
Antimony—	
English (99%) delivered, 10 cwt. and over £210 per ton	Osmium, £24/27 oz. nom.
Crude (70%) £200 per ton	Osmiridium, nom.
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.	Palladium, £8 0s./£8 10s. oz.
	Platinum U.K. and Empire Refined £34/£35 oz. Imported £37 0s./£38 0s. oz.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Rhodium, £42.
Cadmium 12s. 0d. lb.	Ruthenium, £15/£17 oz.
Chromium, 6s. 11d. lb.	Quicksilver, £87 10s. ex-warehouse
Cobalt, 21s. lb.	Selenium, 112s. nom. per lb.
Gold, 249s. 8d.	
Iridium, £29/31 oz.	Silver, 79d. f.o.z. spot and 78½ f.d.
Manganese Metal (96%-98%) £269 according to quantity	Tellurium, 15s./16s. lb.
Magnesium, 2s. 4d. lb.	

ORES, ALLOYS, ETC.

Bismuth	50% 7s. 3d. c.i.f.
Chrome Ore—	40% 6s. 3d. lb. c.i.f.
Rhodesian Metallurgical (semi-friable) 48% ..	£15 15s. 0d. per ton c.i.f.
Refractory 45% ..	£14 15s. 0d. per ton c.i.f.
Small 42% ..	£12 15s. 0d. per ton c.i.f.
Magnesite, ground calcined ..	£28 0s./£30 0s. d/d
Magnesite, Raw (ground) ..	£21 0s./£22 0s. d/d
Molybdenite (85% basis) ..	8s. 2½d. nom. per lb. c.i.f.
Wolfram and Scheelite (65%) ..	264s.0d./269s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.) ..	21s. 0d. nom. per lb. (home)
Ferro-tungsten (80%-85%) ..	18s. 0d. nom. per lb. (home)
Carbide, 4-cwt. lots ..	£39 3s. 9d. d/d per ton
Ferro-manganese, home ..	£66 per ton
Manganese Ore Indian Europe (46%-48%) basis 125s. freight ..	103d./105d. per unit c.i.f.
Manganese Ore (43%-45%) ..	97d./98d. per unit c.i.f.
Manganese Ore (38%/40%) ..	90d./92d. per unit
Brass Wire ..	3s. 1½d. per lb. basis
Brass Tubes, solid drawn ..	2s. 5½d. per lb. basis

Finance	Price June 6	+ or - on week	Rand Gold contd.	Price June 6	+ or - on week	Diamonds and Platinum	Price June 6	+ or - on week	Tin (Nigerian and Miscellaneous) contd.	Price June 6	+ or - on week
African & European	2 1/8	-	W. Rand Consolidated	1 1/8	-	Anglo American Inv.	81	-	Gold & Base Metal	1/6	-
Anglo-American Corp'n	7 1/8	-	Western Reefs	1 1/8	-	Casals	22 1/2	-	Jantar Nigeria	4 10/11	-
Anglo-French	18/9	+6d	O.F.S. Gold			Cons. of S.W.A.Pref.	10/9	-	Jos Tin Area	12 1/3	-
Anglo Transvaal Consols	1 1/8	-	Freddies	7/3	-6d	De Beers Defid. Reg.	41	-	Kaduna Prospectors	2/6	-
Central Mining (E.I. shrs.)	35/9	-9d	Freddies Consolidated	4 6	+1 1/2d	De Beers Pfd. Reg.	14 1/2	-	Kaduna Syndicate	1 1/2	-
Consolidated Goldfields	52/9	-1	F.S. Geduld	9 3/4	-1 1/2	Pots Platinum	11/9	-	London Tin	9/-	-7 1/2d
Consol Mines Selection	1 1/8	-	Geoffries	23/9	+4 1/2d	Waterfall	18 1 1/2	-10d	United Tin	1/-	-
East Rand Consols	2 1/4	-	Harmony	5/9	-	Copper			Silver, Lead, Zinc		
General Mining	3/3	-	Lorraine	16/9	-1/9	Bancroft	40/6	-6d	Broken Hill South	54/-	-1/6
H.E. Prop.	35/-	-1 1/3	Lydenburg Estates	8 7/4	-	Chartered	66/9	-9d	Burma Mines	5/10 1/2	-1 1/2d
Rand Mines	3 1/8	-	Merrispruit	12/-	+1 1/2d	Esperanza	3 1/2	-	Consol. Zinc	47/9	-3/6
Rand Selection	1 1/8	+ 1/2	Middle Wits.	54/-	-1/3	Messina	8 1/8	-	Lake George	12 7/4	-10d
Union Corporation	36/9	-3/-	Ofists	55/-	-1/3	Nchanga	13 1/2	-	Mountain Iron	17/9	-
Vereeniging Estates	42	-	President Brand	29/3	-3d	Rhod-Anglo-American	4 1/2	-	New Broken Hill	37/9	+3/9
Wits	31 10/11	+7 1/2d	President Steyn	26/3	-1/6	Rhod. Katanga	25/9	-	North Broken Hill	41	-
West Wits.	34/6	-	Virginia Ord.	10/6	-	Rhodesian Selection	46 6/11	-6d	Rhodesian Broken Hill	9 10/11	-4 1/2d
Rand Gold			Welkom	3 1/2	-9d	Rhokana	36	-1 1/2	San Francisco Mines	23/-	-
Blyvoor	22/9	+1 1/2d	Western Holdings			Rio Tinto Reg.	2 1/2	-	Uruwira	4/9	-
Brakpan	6/3	+3d	West African Gold			Rio Antelope	25 7/4	-1 1/2	Miscellaneous		
Buffelsfontein	24 1/4	+3d	Amalgamated Banket	1/6	-	Selection Trust	4 1/2	-	Base Metals and Coal		
City Deep	10/6	-6d	Ariston	4 1/4	+1 1/2	Tanks	7 1/2	-	Amal. Collieries of S.A.	47/-	-1/-
Consol. Main Reef	17/6	-7 1/2d	Bibiani	16 1/3	+1 1/2	Thariss Sulphur Br.	7 1/2	-	Associated Manganese	37/3	-1/-
Crown	1 1/8	-	Bremang	1 1/4	-	Tin (Eastern)			Cape Asbestos	9/3	-1 1/2d
Daggas	18	-	G.C. Main Reef	1 10/11	-1 1/2d	Ayer Hitam	20/9	-3d	P. Manganes	28/-	-6d
Dominion Reef	17/6	-3d	Konongo	1/9	-	Gopeng	8 1/4	-3d	Consol. Nurchison	2 1/8	-
Doomfontein	21/-	-1 1/2d	Marlu	2d	-4d	Hongkong	5 1/4	-3d	Natal Navigation	64/-	+2/-
Durban Deep	25 7/8	+1 10/11	Taquah	1 7/4	-	Ipho	23/6	-6d	Turner & Newall	100 1/3	+5/3
E. Champs	3/-	-	Western Selection	8/-	-4 1/2d	Kamunting	8/3	-3d	Wankie	18/-	-
E. Daggas	30/3	-	Australian Gold			Kepong Dredging	3/-	-	Witbank Colliery	4 1/2	-
E. Geduld (45 units)	48/6	-3d	Gold Mines of Kalgoorlie	12/9	-	Kinta Tin Mines	13/6	-3d	Canadian Mines		
E. Rand Props.	4/-	-	Great Boulder Prop.	11/-	-	Malayan Dredging	9 1/2	-1 1/2d	Dome	\$25 1/4	-
Geduld	41	-1 1/2d	Lake View & Star	15/9	-3d	Pahang	10 1/4	-1d	Hollinger	\$48 1/2	+ 1/2
Govt. Areas	20/4	+3d	Mount Morgan	20/6	-1	Pengkalan	11/3	-1	Hudson Bay Mining	\$146	+4 1/2
Grootvlei	37 1/2	+1 1/2d	North Kalgurli	8/-	-3d	Petalung	7/9	-3d	International Nickel	\$170 1/2	+ 1/2
Hartebeestfontein	4 1/4	-3	Sons of Gwalla	2 10/11	-	Rambutan	24/6	-6d	Mining Corp'n of Canada	£91	+ 1
Libanon	13/3	-1 1/2d	Western Mining	9/6	-	Siamese Tin	9 10/11	-7 1/2d	Noranda	\$104	+ 1
Lipsards Vlei	19 10/11	+9d	Miscellaneous Gold		</						

proposed lease area will be divided, not as is customary on the usual vertical basis, but on a horizontal basis, the geological division being known as the Upper Shale Marker. This curious arrangement may prove practicable because geologically payable reefs generally designated as the "Rainbow Reefs" are situated above the upper shale marker, while the Basal reef occurs below the marker.

While the Riebeeck company will apply for a mining lease entitling it to mine all the reefs in the lease area, development work by the Riebeeck company in the initial stages will be confined to the upper reefs. If it can be established that a satisfactory mine exists in the upper reefs, the entitlement to mine the reefs below the upper shale marker will be given to Geoffries under the control of General Mining Corporation. In such an eventuality Middle Wits will be entitled to one-third interest. If it is not possible to establish a satisfactory mining proposition in the upper reefs alone, the Riebeeck company, which will be under the technical and administrative control of Anglo Transvaal Consolidated, will mine the whole of the lease area.

In any event, Riebeeck has arranged with Loraine Gold that twin-crosscuts will be driven immediately from Loraine's No. 2 shaft towards borehole K.1. and subsequently into Riebeeck's proposed mining lease area. These crosscuts when linked to the first shaft of the Riebeeck company, will constitute a second outlet thereby reducing pre-production capital expenditure, assisting in developing the northern area of the Riebeeck mine and enable milling operations to be commenced before sinking a second shaft.

F.S.G.'s New Financing Arrangements

It is now estimated that Free State Geduld will need to borrow up to a maximum of £5,000,000 to finance expenditure at the mine. Anglo American Corporation has agreed as from May 1 last to replace existing temporary loan facilities of £4,500,000 by loans of £5,000,000 open until December 31, 1960, interest on all drawings being at the rate of 6½ per cent per annum.

In consideration of granting these facilities Anglo American Corporation will have the right, on December 31, 1957, to subscribe for 497,346 shares at 80s. per share. This right supersedes the previous arrangement whereby Anglo had the right to subscribe for up to £1,000,000 of new capital raised by Free State Geduld. On the same date shareholders will receive the right to subscribe for 703,900 shares in the ratio of two new shares for every 25 shares held in F.S.G. at the same price of 80s. per share. The shares subscribed by Anglo American will not carry rights to subscribe for the new shares offered to members. The rights now to be granted will, if exercised, absorb the 1,201,246 shares now in reserve. The £5,000,000 loan facilities granted by Anglo American will be reduced by such amounts as may be received by the company from the exercise of these rights.

Rand Dividend Season Opens

Rand Gold producers in the Anglo American Corporation of South Africa group have now announced their summer season dividends. The distributions are much as expected although it is a pleasant surprise to find "Springs" back in the list with a payment of 2½d. after a nil payment a year ago. Of the other payments, "Sallies" is paying more than a year ago and the remainder are repeating their June, 1955 distribution.

	June 1956	Dec. 1955	June 1955	Dec. 1954
	s. d.	s. d.	s. d.	s. d.
Brakpan	4½	7½	4½	6
Dagga	2 9	3 0	2 9	3 0
E. Dagga	9	10½	9	9
S.A. Lands	1 6	1 6	1 4½	1 6
Springs	2½	5½	—	2½
W. Reefs	1 3	1 3	1 3	1 3

Dividends have also been declared by Anglo American Investment Trust which is raising its interim for 1956 by 2s. 6d. to 7s. 6d. per share. The Board of "Amits" explains, however, that this increase should not be taken as an indication of a larger payment for the year, but only as a step towards levelling out the discrepancy between the interim and final dividend. West Rand Investment Trust is maintaining its interim dividend at 9d. per share on an issued capital of £4,916,235.

Demand For Diamonds Outrunning Supplies

Demand for gem diamonds so far this year has been much greater than during the corresponding period of 1955, said Sir Ernest Oppenheimer at the annual meeting of De Beers

Consolidated Mines held in Kimberley on Wednesday of this week. For the first five months of this year Sir Ernest revealed that sales of gem stones totalled £20,465,000 against £23,473,000 in the first five months of 1955 and that during the same period sales of industrials totalled £8,758,000 compared with £9,055,000. As the contraction in sales already announced in respect of the March quarter of this year had, he felt, been interpreted as a falling off in demand, he now made it clear that the reduction in the sales was due to the fact that the supply of diamonds available to the market during the past five months had been less than during the same period in 1955.

Central Mining Invests in South Africa

Lord Baillieu, chairman of The Central Mining and Investment Corporation, at the annual meeting held in London on May 31, gave it as his opinion that the reason why the Kaffir market had not attracted the support and interest of the general investing public was due largely to more attractive alternative investment opportunities and the uneasiness caused in the minds of the overseas investor flowing from the sharp conflict within South Africa on certain racial and constitutional issues.

Be that as it may, these acknowledged reasons have not deterred the Corporation from substantially increasing its investment in South African securities. The foregoing remarks and other interesting comments are given in Lord Baillieu's speech to shareholders, which is reported in this issue on page 718.

Consol. Murchison's Unpredictable Antimony Market

Since the publication of Consolidated Murchison (Transvaal) Goldfields' annual report, there had been a contraction in the demand for antimony and consequently a drop in the company's profits in the June quarter could be expected, stated Mr. B. L. Bernstein, at the company's annual meeting held in Johannesburg at the beginning of this week.

According to an Agency message from Johannesburg, Mr. Bernstein said it would be appreciated that the antimony market was "quite unpredictable" and in view of Russian and Chinese competition, it was impossible to obtain reliable estimates regarding future sales. Nevertheless, it was hoped that the profits earned during the second half of this year would be held at the same level achieved in the first six months. During the first three months of the current year Consolidated Murchison's profits, before taxation of £73,000, were computed at £250,900.

U.S. Bid for Trinidad Oil

The Texas Company of the United States have offered to acquire the whole of the issued capital of the Trinidad Oil Company (formerly Trinidad Leaseholds) at a price of 80s. 3d. per 5s. stock unit. The offer was made known after market hours on Wednesday the shares of Trinidad Oil closing at 41s. 6d. The Texas Company's offer is subject to certain conditions which are still under discussion.

H. J. Enthoven Looks Forward After Bad Year

H. J. Enthoven and Sons, the well-known lead and antimony refiners experienced a bad time in 1955, this comment being amply borne out in their report and accounts which shows a consolidated net loss for the year of £44,152 compared with untaxed profits in 1954 of £142,996.

Mr. A. M. Baer, chairman, in explaining this unfortunate result, points out that the company's smelting and refining of lead and lead alloys produced only a slender profit, the chief subsidiary incurred a loss, and thirdly, another subsidiary—although making good progress on the technical side—has not yet reached profit earning stage. Nevertheless, the Board believes its main interests—that of smelting and refining of lead, antimony and tin residues and the production of high purity alloys of these metals, is basically sound. They have, therefore decided upon a policy of broadening the basis of the company's smelting and refining activities, re-organize its Rotherhithe factory to enable additional materials to be treated and increase the efficiency of its operations and also to handle solder production transferred from the Croydon factory, which is to be sold. Moreover, the selling organization has been strengthened and the Board looks forward to improved results in the future.

To revert briefly to the accounts the dividend has had to be passed on the ordinary shares. To service the preference shares and to absorb the loss incurred, the balance carried forward at the end of the year was reduced to £48,590 compared with £95,493 brought in.

Rand and O.F.S. Returns for May

Rand and O.F.S. gold mining returns for May, based on a gold price of 248s. 8d. per oz. were, in several instances, very good indeed. The centrepiece of the returns was that made by Vaal Reefs whose maiden profit announcement totalled more than £54,000. St. Helena raised its tonnage throughput by as much as 19,000 tons to 115,000 tons to register an increase in working profits of close on £20,000. Hartebeestfontein's profit figure of £170,600 was a record as was that from Doornfontein which advanced £9,500 to approximately £103,000.

Welkom made a definite improvement. President Brand retrieved her position and West Driefontein continued to go from strength to strength.

Company	May, 1956			Current Financial Year			Last Financial Year		
	Tons (000)	Yield (oz.)	Profit† (£000)	Tons (000)	Yield (oz.)	Profit† (£000)	Tons (000)	Yield (oz.)	Profit† (£000)
Goldfields									
Doornfont'n	65	25,838	102.9	596	239,721	945.1	548	194,992	934.1
Libanon	102	22,059	53.2	1,075	234,915	609.0	1,088	228,487	592.1
Lupatards V.I.	127	16,750	14.5	1,369	192,594	660.0	1,278	232,853	442.4
Rietfontein	26	5,917	18.2	130	29,528	91.9	133	29,980	101.9
Robinson	76	14,263	116.6	385	81,790	15.9	412	88,743	106.7
Simmer	102	17,644	17.1	508	88,270	76.4	588	98,032	75.6
Sub Nigel	67	20,299	68.7	729	226,952	822.4	728	238,492	1011.0
Venterspost	123	29,219	71.3	1,329	315,260	821.4	1,189	291,709	713.4
Vlakfontein	44	15,840	361.8	202	73,740	647.9	193	66,973	368.0
Vogels	100	25,165	118.2	503	124,414	678.1	514	132,780	641.4
West Drie	71	64,848	523.0	710	584,001	4660.8	573	435,739	3403.0
Anglo									
American									
Brakpan	109	18,556	15.0	533	80,886	67.1	532	90,637	73.3
Daggas	228	51,609	290.1	1,066	242,607	1369.4	1,126	257,073	1582.6
East Daggas	96	15,817	36.0	476	78,553	178.9	478	79,903	337.2
F.S. Geduld	39	14,187	42.4	181	62,825	159.6	—	—	—
Loraine	49	8,576	119.4	347	57,589	1212.6	—	—	—
P. Brand	56	43,365	357.6	417	333,145	3736.8	—	—	—
P. Steyn	30	33,976	195.4	678	248,741	1411.4	—	—	—
S.A. Lands	90	18,227	56.3	436	86,783	256.1	476	89,520	282.0
Springs	126	15,286	9.0	627	76,688	58.5	593	79,081	39.5
Vaal Reefs	45	14,731	115.4	000	000,000	0000.0	000	000,000	00.0
Welkom	87	19,371	40.3	665	141,480	196.3	—	—	—
W. Hold's	78	31,776	192.1	603	224,485	1393.1	—	—	—
W. Reef Ex.	117	23,642	27.1	590	117,297	221.2	591	109,700	272.5
Central									
Blyvoor	112	61,611	439.5	1,158	652,556	5727.2	1,147	260,498	5083.2
City Deep	155	30,367	2.5	735	143,398	13.8	794	153,733	26.4
Cons. M.R.	175	23,864	10.3	1,867	263,342	166.7	1,909	275,785	290.7
Crown	302	46,348	25.2	1,432	226,355	165.7	1,471	237,435	246.0
D. Roodep't	188	32,926	54.0	900	154,958	254.5	879	148,633	242.1
E. Rand P't	216	56,152	175.5	1,041	269,642	878.2	1,053	250,255	772.0
Harmony	79	31,199	90.5	1,017	312,975	1608.6	418	148,531	507.3
Modder East	141	14,615	5.6	1,436	151,248	71.5	1,363	152,534	167.2
Rose Deep	44	7,066	0.4	220	36,227	7.4	302	47,148	40.4
J.C.I.*									
E. Champ.	12	973	6.0	77	5,121	230.1	99	7,640	29.9
Freddies C.	59	12,321	133.5	311	59,713	1227.7	417	75,522	1235.7
Govt. G. M.	260	30,766	418.0	1,227	211,790	93.7	1,270	165,171	169.2
Randfontein	253	23,760	105.2	1,246	121,280	4506.3	1,284	145,972	452.8
Union									
East Geduld	150	46,128	329.8	707	218,677	1553.4	735	226,029	1698.7
Geduld Prop	107	17,096	33.1	527	78,299	173.9	502	82,626	224.7
Grootevlei	207	44,301	236.9	959	207,103	1121.5	945	204,324	1167.2
Mariavale	74	19,432	90.5	351	92,095	423.7	363	91,177	435.2
St. Helena	115	32,778	172.6	491	145,573	779.0	515	119,369	583.2
Van Dyk	81	13,073	1.8	400	65,057	7.1	397	65,789	7.2
General									
Ellaton	32	7,655	35.4	158	38,160	166.5	150	45,600	231.0
S. Roodep't	29	6,574	23.9	276	62,936	224.0	274	59,310	202.0
Stiffontein	89	35,080	207.4	436	171,422	1012.9	417	163,906	1032.4
W. Rand C.	247	25,394	228.7	1,155	117,551	1120.2	1,174	137,774	1104.3
Anglo-Transvaal									
Hartebeestfontein	63	30,183	170.6	586	261,856	1349.2	—	—	—
Merriespruit	76	17,606	152.9	226	51,618	154.1	—	—	—
N. Klerksd'p	11	1,241	86.1	54	6,417	36.1	56	7,009	13.1
Rand Leaser	188	29,328	12.0	1,954	301,380	245.0	2,043	337,303	505.6
Village M.R.	35	5,097	9.0	395	55,424	102.2	379	56,944	109.4
Virginia	80	18,420	114.2	806	175,235	1125.2	416	82,563	140.3
Others									
Nigel Gold	35	3,987	3.8	164	18,917	10.1	119	18,287	5.8
N. Klein'n.	108	12,639	1.0	526	61,742	14.0	535	63,914	29.0
Wit. Nigel.	18	4,039	7.0	202	42,721	85.7	197	43,629	105.2

* Working Profit figures includes Sundry Revenue.

† Working Profit.

‡ Gold and Uranium.

L indicates loss.

c after crediting £31,000 estimated uranium revenue.

d after crediting £13,501 estimated revenue from pyrite.

e after crediting £400,000 estimated net revenue from uranium and acid.

f after crediting £335,000 estimated profit from uranium.

g after crediting £11,500 from uranium, before deductions of £750.

h excluding uranium profit which is declared quarterly.

i after crediting £117,325 from acid and uranium; before deducting repayments of £17,815.

k owing to change in financial year end, previous year's figures are not comparable.

m maiden return.

n including £5,900 estimated uranium profit.

Company Shorts

Frontino Gold Mines Pay More.—Frontino Gold Mines have recommended final dividends of 10 per cent, tax free, on the company's 10 per cent Cumulative Participating Preference and on the Ordinary stock making a total of 17½ per cent, tax free, on both classes of capital for 1955. This compares with distributions totalling 15 per cent, less tax, on both classes for 1954. The net profit for 1955, after providing for Colombian tax of £50,859 (£18,799) and writing off fixed assets the sum of £49,320 (£38,069), was £178,085 compared with £47,306 in 1954. Lord Rathcavan is chairman. Meeting, London, July 10.

Hendersons' Keep Dividend at 15 Per Cent.—For the tenth year in succession Hendersons Transvaal Estates' dividend is being maintained at 15 per cent. Estimated group profits for the year ended March 31, 1956, rose to £103,447 against £78,462 and was struck after providing £85,423 (£70,950) for taxation.

Ampat Tin Pays 12½ Per Cent More.—Ampat Tin Dredging in a preliminary profits statement have announced that profits before tax, but after providing £43,565 (£25,099) for depreciation and depletion, totalled £255,574 for the year 1955 against £166,913 earned in 1954. Taxation took more, £136,000 (£98,000) while additional depreciation (including tax relief on investment allowances) absorbed £20,000—the same sum as was allocated to contingencies reserve.

Shareholders will be asked to approve a proposed final dividend of 37½ per cent at the annual general meeting to be held on June 26. This distribution will bring the total payments to shareholders for 1955 to 55 per cent which compares with 42½ per cent paid in 1954.

West Vlakfontein: Embryonic Finance Company.—West Vlakfontein Gold Mining Company having surrendered the bulk of its lease area is now pursuing the policy of utilizing its cash assets of approximately £225,000 to invest in ventures of a promising nature. As a first step a non-contributory interest has been taken in the new Far East Rand area and the chairman, Mr. E. Jacobson, in his address to shareholders accompanying the full report and accounts for the year 1955 states that the company is concerned in mineral option contracts in this area covering a total of approximately 93,000 acres.

The company's stake in this area has been furthered by its participation in the underwriting of the rights issue of Winkelhaak Mines, and similarly of Tati Goldfields as a result of which a substantial block of shares in Winkelhaak has been acquired. Certain funds have also been invested in shares in other companies. However, as the chairman points out, it is obvious that the company's capital structure is well out of line with its existing assets, and that a re-organization will be necessary. Meeting, Johannesburg, June 29.

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THE CENTRAL MINING & INVESTMENT CORPORATION

MAINTENANCE OF STRONG FINANCIAL POSITION

LORD BAILLIEU'S SPEECH

The 51st Annual General Meeting of The Central Mining and Investment Corporation Limited was held on May 31 in London.

The Rt. Hon. Lord Baillieu, K.B.E., C.M.G. (the chairman) presided and in the course of his speech said:

The very active conditions of the stock markets in 1954, especially in South African mining shares, gave way to quieter conditions in 1955, with declining prices which have persisted up to the present time. These have two main effects on our results: first, the profits arising from trading in shares necessarily suffer and, second, the provisions for diminution in the value of some of our investments are inevitably larger.

We continue to value our portfolio at cost or Stock Exchange price or, where there is no quotation, Directors' valuation, whichever is lowest. Diminution in value of investments acquired in 1955 is, as usual, charged against the profits of the year. Of £220,000 so charged in 1955 no less than £103,000 is in respect of British Government Securities, but, as the stocks concerned are all dated, recovery in value is only a matter of time or downward adjustment of interest rates as the case may be.

The significant change in the balance sheets calling for comment is the addition of £1 million to the value of our portfolio of investments. I would specifically mention a substantial addition to our holding in the Harmony Gold Mining Company Ltd. and the acquisition of a considerable holding in Rhodesian Anglo American Ltd.

Our financial position remains strong, the net surplus of current assets being almost £2 million.

THE ECONOMIC POSITION

During 1955 the Union Government found it necessary to adopt a policy aimed at countering inflationary tendencies which were reappearing in its economy. The monetary and fiscal measures taken were by no means drastic, but in conjunction with a comparatively small net inflow of foreign capital they nevertheless had an important effect on the country's economic development.

During 1956, it is likely that development in the public sector will continue at a high rate on account of the backlog in various public services which still exists. In the private sector, however, the general tightness of money, if it persists, may cause a contraction in the volume of economic activity. It is the intention to hold imports at about the 1955 level during the current year, but the anticipated increases in production of gold and uranium, combined with greater exports of merchandise, will have a beneficial effect on the Union's resources of gold and foreign exchange. These had shown an increase in 1954 of some £44 million, whereas there was a decrease in 1955 of some £20 million and a further decrease in the first four months of this year of about £16 million. The alteration since the beginning of 1956 is not abnormal for the time of the year, but it underlines the vital importance to the country of ensuring the utmost possible extraction of the gold from its mines. In our own Group, there are seven mines whose working profits are now less than 2s. per ton milled. The gold which they produced in 1955 was valued at more than £13 million. Much low-grade gold-bearing ground still remains in these and other similar mines and will be lost to South Africa with the continued rise in working costs. This is, of course, for the future.

As to the immediate past, the actual results for 1955 record a notable increase in the scale of operations of both the gold mining and uranium industries. Foremost among the contributory factors were the expansion of production at a number of newer mines, notably those of the Orange Free State, an increase in the labour force, an improvement in the supply of electric power and the addition of a number of new producers of uranium. The uranium industry has already shown good returns, both to the producing companies of which it is composed and to the Governments by whom it has been financed. From the effective starting of the industry at the end of 1950 to the end of March, 1956, the S.A. Atomic Energy Commission has advanced just under £60 million on loan for capital works; it has already received back about £7½ million in loan repayments and interest from some of the mines concerned and "prescribed" materials to the value of £51½ million, while the industry has declared profits of £27½

million. South Africa's exports of "prescribed" materials are expected to rise to about £50 million annually.

UNDISTRIBUTED PROFITS TAX

Reference to our principal industrial investments has been made in the Directors' Report. Our South African industrial investments have all recorded progress, but there is one feature common to them to which I must refer, that is the application of the Undistributed Profits Tax. When this impost was introduced in the South African Budget of a year ago, its object was to prevent the avoidance of super tax by shareholders in private companies; the revenue from the tax was not expected to be important. It was, however, to be applied to both public and private companies on profits in excess of 30-40% of total profits (depending on the type of business) which they decided to plough back. In other words, notwithstanding an inflationary condition in the Union, increased distributions of profit were to be encouraged. It is instructive to contrast this with the situation in the United Kingdom where the Profits Tax, having been introduced in 1947 with the objects of providing a source of revenue to the Government in substitution for Excess Profits Tax and assisting in the prevention of inflation, has come to be used as a means of exerting pressure on companies to plough back profits and restrict distributions.

I am glad to say that in the Budget of this year the Union Minister of Finance has proposed an amendment, the effect of which will be to exempt from the Undistributed Profits Tax profits equivalent to the cost of all new machinery and plant brought into use by a company for the purpose of its trade during any year of assessment. While the amendment introduces some relief, I must still voice disapproval of the tax even in its present form. In these matters, I think it is wiser for decisions to be taken on merits and not according to some arbitrary rule of tax law. Over any reasonable period of time it is my opinion the State is more likely to be a gainer than a loser by measures which encourage capital formation.

NOTABLE CONTRIBUTION TO SOUTH AFRICA'S WEALTH

This Corporation and the other Mining and Financial Houses have made a notable contribution to the wealth of South Africa, and they bear great responsibilities to their shareholders and their employees, as well as to the Government of the day. They operate subject to the laws of the Union and within the framework of current Government policy.

Recently the market in South African shares has not attracted the support and interest of the general investing public. I think the reason for this is, broadly, twofold, and may be simply stated.

Firstly, in recent years investment opportunities in other markets have been more attractive and funds have flowed there.

Secondly, the sharp conflict within South Africa on certain racial and constitutional issues has created disquiet in the mind of the overseas investor. This has engendered caution, resulting either in a loss of interest or, in some cases, in a positive liquidation of South African securities.

The broad result has been that the "Kaffir" market, which is a barometer of public feeling of the Union's greatest exporting industry, if not friendless, has lacked the sustained and active interest of informed investment opinion.

So far as the Corporation's action is concerned I have already mentioned that, in the year under review, we substantially increased our investment in South African securities.

In South Africa you have a country endowed with great mineral wealth, with a progressive agriculture and with an expanding industry. You have a native population whose standard of life and whose technical and industrial aptitudes are capable of a steady rise, giving the opportunity of an expanding home market for the production of goods and supply of services. You have a country irrespective of party, firm in support of the Western world, and, in this nuclear age, less vulnerable to sudden and overwhelming attack. We believe that present conflicts which divide opinion in South Africa and create doubt abroad will yield to the saving grace of time and the basic common sense of South Africans.

The report and accounts were adopted.

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FUEL SAVING PAYS FOR OUTLAY

To get the same amount of air from other compressors would, in most instances, require an additional 15 h.p., but 15 h.p. never used mean an *annual saving on fuel bills of £270*. That amount of money represents approximately *one-fifth* of the initial cost of the AR 3. In five years, that's your money back!

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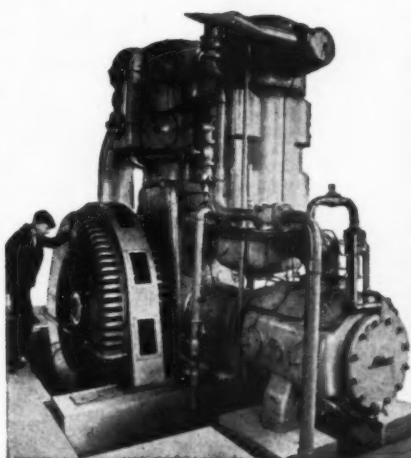
Three-step valve unloading control on smaller models or five-step clearance pocket control on larger sizes permits flexible adaptation to variations in air demand. Also means smooth flow of current to motor.

LOW DISCHARGE TEMPERATURES

Amply-dimensioned water pockets, the two-stage design and streamlined air passages give discharge temperatures below 270°F at 100 lbs. per sq. in.—as compared with 475°F from most single-stage machines. Lower temperatures mean longer valve life and elimination of the risk of air receiver and pipe-line explosions.

EXTRA-SOLID CONSTRUCTION

High-class Swedish materials and steel throughout; amply-dimensioned parts reduce stresses to a minimum; crankshafts carried on SKF roller bearings; cross-head design with ground or white-



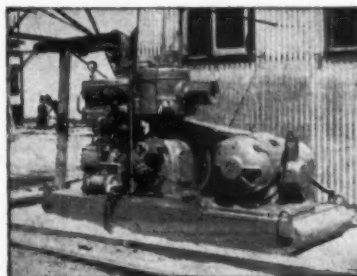
An Atlas Copco AR9 Compressor installed at N.C.B. Mountain Colliery, S. Wales

The photographs in this advertisement are published with the permission of the National Coal Board

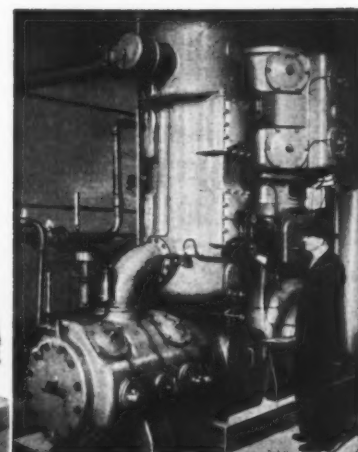
metal lined bearings avoids piston side pressure, eliminates cylinder wear.

EASE OF INSTALLATION

Right-angled, double-acting cylinders combined with counterweighted crankshaft provide a very low weight/capacity ratio and extremely good balancing—thus reducing foundation requirements. So good indeed, that most models can be mounted on a skid underframe and used as semi-portable units without any foundation or bolting-down.



A skid-mounted Atlas Copco AR Compressor in operation at Pima Mining Co., Arizona, U.S.A.



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Readers in countries outside those listed above and who do not know the name of their local Atlas Copco company or agent, please write to Atlas Copco AB, Stockholm 1, Sweden.

PERFORMANCE FIGURES OF ATLAS COPCO AR COMPRESSORS

Type	Maximum pressure lb./sq. in.	Speed at 50 cycles r.p.m.	Low-pressure piston displacement cu. ft./min.	Free air delivery at 100 lbs./sq. in. cu. ft./min.	Power required at 100 lbs./sq. in. h.p.	Cooling water required at 60° F approx. gal./hr.	Weight lbs.
AR 1	120	600	404	330	62	310	2860
AR 3	120	500	718	570	105	506	5280
AR 4	120	429	915	760	138	682	5610
AR 5	120	375	1230	1000	185	880	9020
AR 7	120	333	2120	1750	320	1540	14520
AR 9	120	300	4020	3220	587	2926	26400

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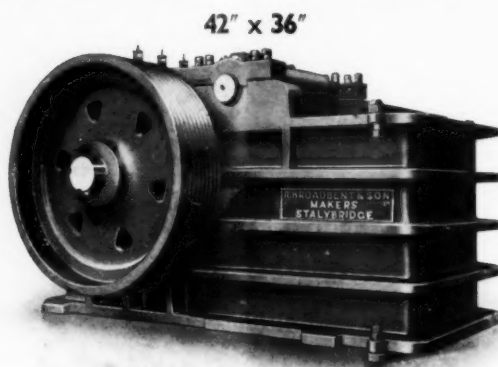
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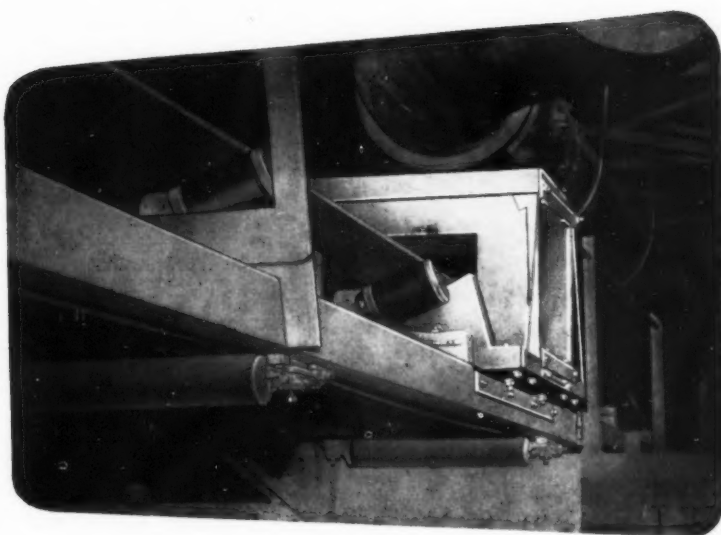
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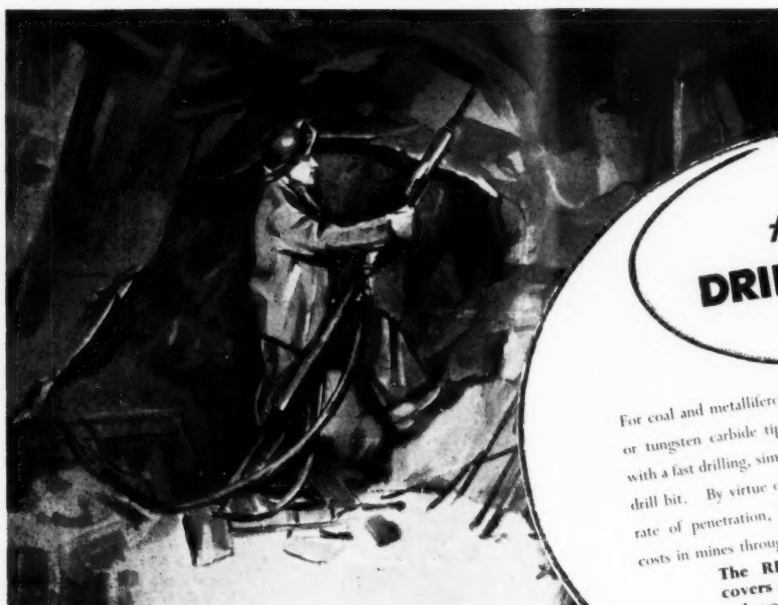
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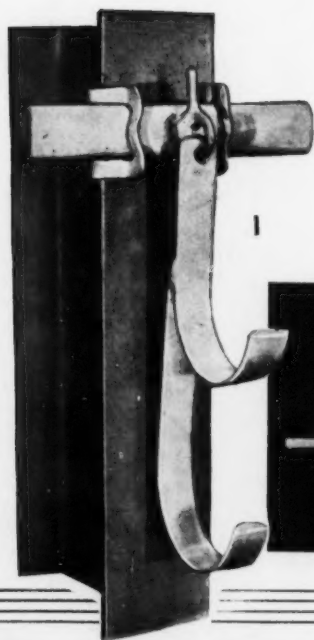
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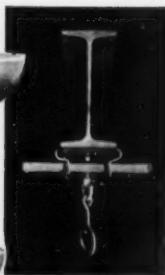
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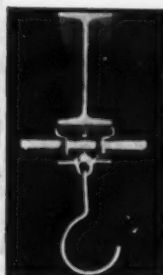
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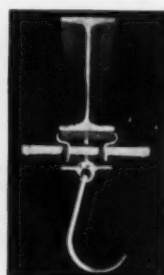
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